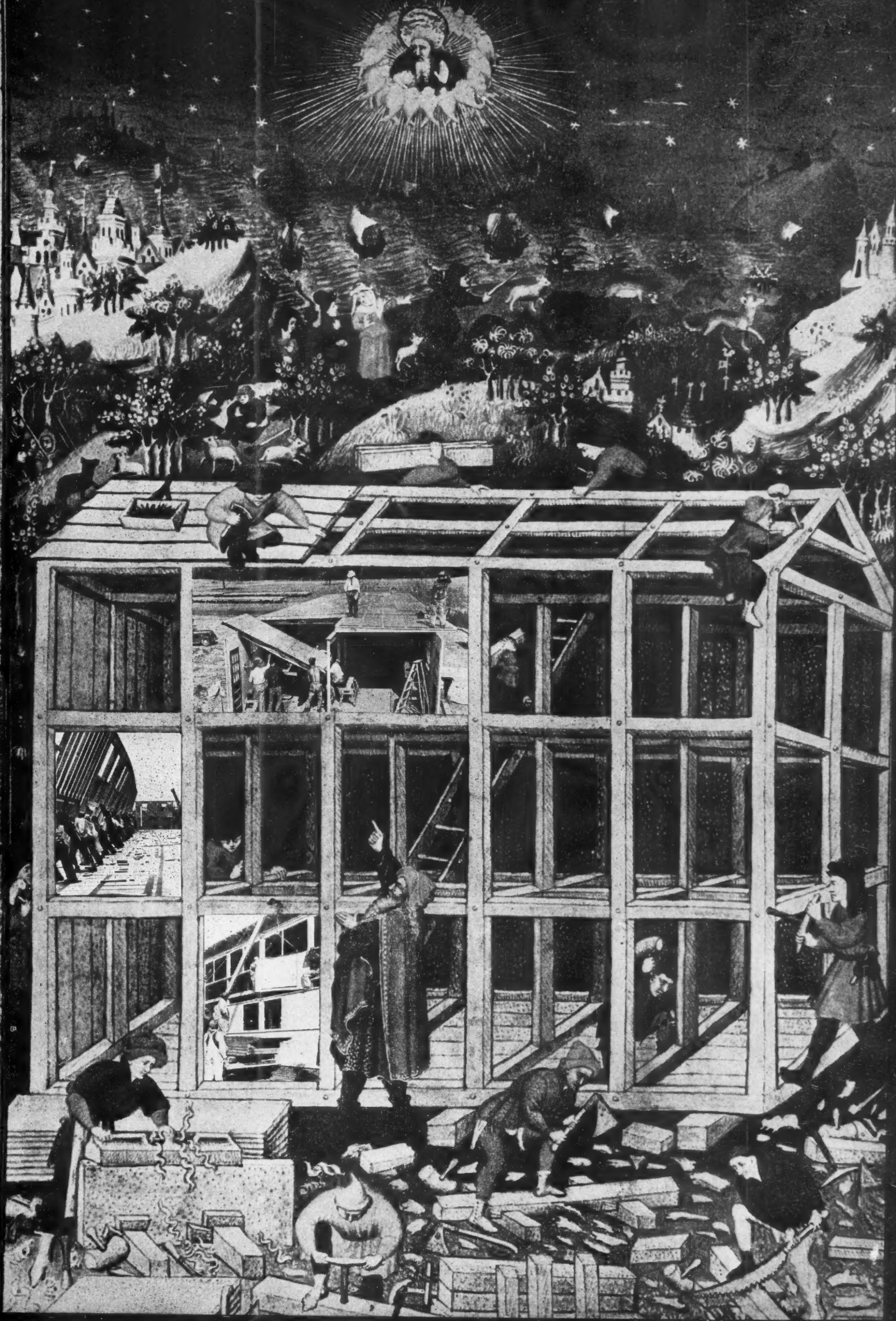


# WARTIME HOUSING

THE ARCADE MAGAZINE  
August 1944



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# US WARTIME HOUSING

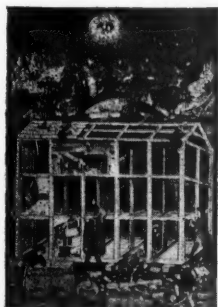
*This number is a record of an exhibition held at the Royal Institute of British Architects by the Office of War Information of the United States Government. It was prepared by the Museum of Modern Art in New York. Mary Cooke designed it, Catherine Bauer acted as consultant, and the Standards Section of the National Housing Agency (Vernon DeMars, chief) assembled the data on building materials and methods. THE ARCHITECTURAL REVIEW wishes to place on record its gratitude to Emay Twining and to Victor Weybright for help in many ways. Richard Sheppard who wrote the running commentary on the American achievement (pages 34 to 60) has for some years been engaged in the design and construction of one particular type of prefabricated house in England.*

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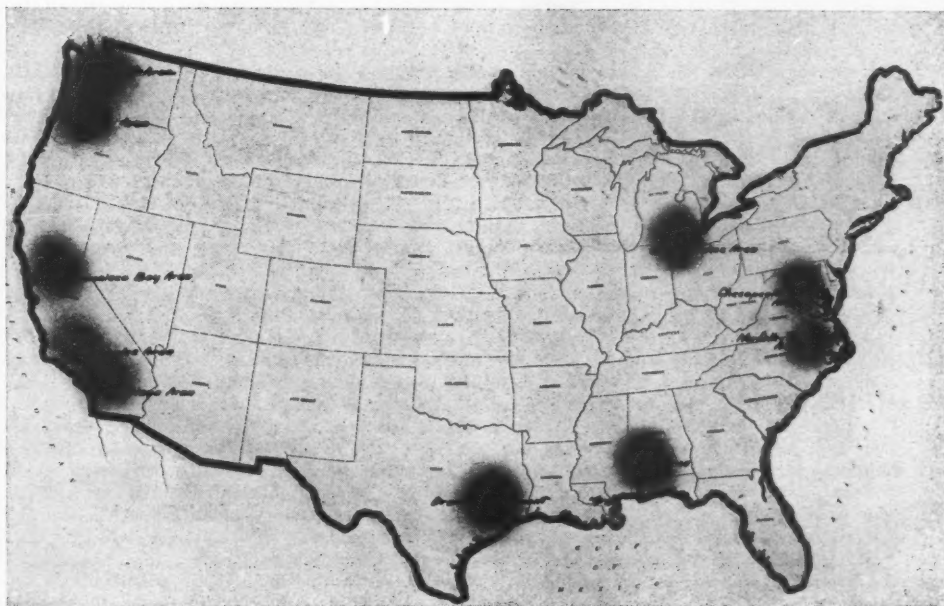
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TWO SHILLINGS AND SIXPENCE



### THE PROBLEM

What comes as an utter surprise to most English Planners is the quantity of well-designed wartime housing completed in the United States and the decisive and, it seems, universally accepted role which prefabrication plays in it. Owing to the plentiful supply of timber in America, most of the houses are timber-framed, and it may thus not be amiss to remind all those frightened of emergency construction and mobile housing that both are about as old as human records; as old, that is, as Noah's Ark reproduced on the cover as it is illustrated in the Bedford Book of Hours painted about 1425 (B.M. 18850, reproduced by permission of the Trustees of the British Museum). THE ARCHITECTURAL REVIEW has taken the liberty of making Noah point to some American examples of pre-assembly, because there does not seem to be much difference between Noah 7000 B.C. and F.D.R. 1944 A.D. The American achievement in wartime house-building dwarfs our own efforts. 1,750,000 housing units have been built there since the war. Yet it must not be forgotten that war industry drove eight million people into the chief centres of urban life, the states indicated in the map on the right. The problem to be solved was one of immediate urgency. Over here most research has been devoted to post-war purposes, and we have therefore quite legitimately not yet more to show than a few experimental houses. Excuses however are not needed. Each country has to face its own difficulties; and that is what the U.S. have done.



**INTRODUCTION.** This issue is given up entirely to one subject—American housing. The material shown here is on view at the exhibition of *American Housing in War and Peace*, which is being held at the Royal Institute of British Architects this month. This issue of the REVIEW may be regarded as a permanent record of the exhibition. There are three developments in particular which give the exhibition architectural significance: 1. It shows that before the war America was in the process of establishing a high standard of State subsidised housing. America was profiting by the experience we had painfully gained in this country and was starting at the point where we left off. 2. When the war began America had to improve accommodation for the workers in the newly developed industries. She did this by every means available, by the conversion of existing houses, by caravans and trailers, by permanent and temporary housing of all types. The exhibition gives a clear and undistorted picture of this improvisation. It shows the good and bad, but it shows a steady improvement in standards of accommodation, and in equipment and planning. The first flood of immigrant workers created boom town conditions and a state of affairs rather like that summarised by Chaplin in the Gold Rush. By the end of 1942 these conditions were giving way to planned dormitory suburbs and new townships, many of them beautifully sited and laid out. The methods by which the achievement was made possible are an interesting commentary on modern building practice and technology. Bulldozers and mechanical plant of all kinds were used for the site work and the American ingenuity in mechanical means of fabrication was given full opportunity in the design of the houses. Many of these buildings are aesthetically satisfying and show that the American architect rapidly found his feet in a new world of standardisation and prefabrication. The programme is a triumph for the architect and planner. 3. It shows that America is developing a national architecture. Everywhere in the exhibition allowance has been made for differences in climate and material, yet the buildings themselves show that America is developing a vernacular as unmistakable and unique as her language. In particular, if one aspect of the exhibition can be isolated, the Americans are in the process of establishing a tradition in town planning. The specific American developments of the super-block in relation to a system of neighbourhood planning, and the interesting phase which began with the Green Belt towns is carried a stage further. The exhibition is important because it is shown at a time when the prospect of peace begins to lighten the sorrow of the fighting and the bombing. We have much to reconstruct in this country and more in Europe. We have a housing problem whose dimensions perhaps are only exceeded by that of America and our resources in men and material are infinitely less. We have to build, at the minimum, 4 million houses—as many as devastated the landscape round our large cities between the two wars. Mr. Churchill says that we need 500,000 prefabricated houses for temporary homes in the first two years of peace. If we do not attend to this problem, and plan the programme well in advance of its commencement we shall ruin an even greater area than last time, and clog our transport system beyond hope of redemption. There must be no repetition of the development between 1919 and 1939. The Americans have given us an indication of the way in which it might be carried out. They show us that prefabricated houses, if they are properly sited and related to a communal pattern, can make worthy and beautiful homes. They show us how new housing estates and townships can be built in such a way that they are satisfactory in themselves and do not strangle the older centres to which they are attached. They show us the possibilities that exist in the use of land hitherto unsuitable for agriculture or for housing. They indicate some of the means by which our problem can be met and solved.

## LARGE SCALE HOUSING IN U.S. 1918-1944

By the Museum of Modern Art

**T**HE history of planned large-scale housing in the United States began with the public housing programme in World War I. Although public housing was discontinued at the end of the war, the war programme left its mark on private building and furnished valuable experience when public housing was revived in the 'thirties.

Permanent houses of good quality were built wherever post-war need was likely. Temporary houses were used only in isolated new communities built around explosive plants. The garden city idea which had been applied in English war developments influenced most of the war housing built in the United States as well.

The Emergency Fleet Corporation and the United States Housing Corporation, public agencies established in 1918, together built houses for some 15,000 families and dormitories for 35,000 single persons. But the first tenants of the Housing Corporation did not move in until nearly two months after the Armistice was signed, and many of the Corporation's projects were sold before completion. In July 1918 Congress directed that the rest should be disposed of. Where possible, houses were sold to home owners rather than to speculative investors.

A year after the Armistice a congressional investigation found that the houses were "too good"; that time had been "wasted" on community planning. Officials of the Corporation were accused of "making a demonstration of model housing."

### planned communities

Whether or not the "demonstration" was intentional, it had its effect: In the next decade the garden city influence began to show in higher rental developments and in the best of industrial housing. The standard English definition of a garden city is: "... a town built for industry and healthy living; of a size that makes possible a full measure of social life, but not larger; surrounded by a permanent belt of rural land; the whole of the land being in public ownership or held in trust for the community." No development in the United States meets all these conditions. Either the agricultural belt is lacking, or land is not in public ownership, or the developments are dormitory suburbs only.

### towns for the motor age

In 1928 a twentieth-century American contribution to the garden city idea was made. A new "town for the motor age" was built. This is Radburn, New Jersey, seventeen miles from New York City. Here the "super-block" with indented cul-de-sac streets, which had been used in English developments, was enlarged to include continuous inner park space bordered by individual gardens.

The Radburn plan was further developed in 1935 at Greenbelt, Maryland, ten miles from Washington, D.C., as well as at two other similar suburban communities: Greendale, Wisconsin, and Greenhills, Ohio. These were built by the

Resettlement Administration, a Government agency established during the depression. Aside from their value in creating work and helping the construction industry, these "green-belt towns" were considered as part of a general land-planning programme. The basic programme followed that of the English garden city—except for the very important omission of local industry.

Families with incomes ranging from \$1,200 to \$2,000 per year were housed in the original developments.

### farm security administration 1938

In 1938 the Farm Security Administration in the Department of Agriculture took over the Greenbelt towns along with the Resettlement Administration's rural projects. The rural programme was continued with provision for migrant workers (in mobile units, semi-permanent subsistence homesteads and permanent co-operative farms). Often these types were combined in a single settlement. It was realized that just because accommodation had to be minimum, it ought to be especially carefully planned, and community activities and services were fully provided for. Excellent use was made of sites. The resulting designs are varied and imaginative, and clearly prove that neither low cost nor Government operation need stand in the way of satisfactory architectural expression.

The Farm Security Administration also provided decent housing for the first time for thousands of isolated

small farms by means of prefabricated units built by conventional construction methods but with pre-assembled panels. Later on, some war housing was done by the F.S.A.

### public works agency 1933-1937

Before the rural and suburban developments were begun, urban public housing had already unobtrusively entered the national scene as part of a programme of public work for the relief of unemployment. In 1933 the Housing Division of the Public Works Administration was established to make loans for housing to both public agencies and private corporations.

Since no public bodies with authority to build housing existed in the United States in 1933, the Division at first dealt with private "limited dividend" corporations (similar to English Public Utility societies). It was swamped with applications from hopeful investors, many of whom, for lack of cash, offered inflated land values as equity. Only a handful of projects met the requirements (among them the one built by the Hosiery Workers' Union in Philadelphia). The conditions necessary to achieve low-rent housing and slum clearance were not generally understood.

The need for a different kind of attack was recognized and attention was turned to the building of low-cost slum clearance and rehousing projects. The primary purpose of its programme, however, was still "unemployment relief and recovery."



Although loans were still available to private enterprise, the new Corporation was directed to encourage the creation of municipal, county, and state housing authorities which could assist in the programme. Housing was to be made available at "rentals never before attained," for use by low-income families only.

Since the work involved in handling applications from limited dividend corporations was not worth what could be gleaned from them, applications were accepted only for projects sponsored by local officials or "groups of representative and responsible citizens or civic organizations." But citizens' groups interested in improving housing conditions existed in only a few of the larger cities in the country; and in order to create active housing authorities, municipalities had to be empowered by the legislative action of the individual States.

Moreover, relief still came first and the Division's funds repeatedly were taken away to meet immediate relief needs. After July 1935 no more allotments were made. The housing programme had no existence in its own right, and as a relief measure it appeared to move too slowly.

The rents originally set proved to be too high, and in June, 1936, the Administrator of the Housing Division was empowered to fix rents to cover only administrative expenses and financial charges on 55 per cent. of initial cost. Since the developments were subsidized, they were to be available only to families "who lack sufficient income, without benefit of financial assistance, to enable them to live in decent, safe, and sanitary dwellings." No family with an income more than five times the rent was accepted: "Rent" included the average cost of heat, light, water, and cooking. A small sum was to be paid by the Federal Agency to the locality, in place of taxes. (National property is tax exempt.)

The Public Works Agency's housing programme adds up to just under 25,000 dwelling units in seven limited dividend corporation projects and 50 projects directly constructed. The latter were taken over by the United States Housing Authority, created by an Act of Congress in 1937.

#### United States housing authority 1937-1941

In 1935 and 1936 bills to initiate a public housing programme had been introduced in Congress by Senator Robert F. Wagner, who had studied housing programmes and achievements in England and on the Continent. By 1937 others were interested in fostering a housing programme, and in that year five public housing bills were introduced. They were largely similar in their major premises—that the National Government has responsibility with respect to removing slums and housing the lowest income groups, since neither private enterprise nor State and local governments alone can do the job; that restrictive building legislation is of little help; and that therefore National aid for housing means public initiative and subsidy. Nevertheless, it was recognized that active responsibility should be as decentralized as possible.

The Wagner-Steagall Bill became

the United States Housing Act of 1937. The passage of this Act was headline news. Housing was still yoked to unemployment relief, but aid to localities for improvement of housing conditions "injurious to the health, safety, and morals of the citizens of the Nation" was established as national policy.

#### programme

The provisions of the Housing Act were largely derived from existing English legislation. Local governments were required to take the initiative and contribute support. The United States Housing Authority was empowered to make loans and subsidies to local public housing agencies only. The National Authority could lend up to 90 per cent. of the capital cost of projects. The Local Housing Authorities were required to repay this loan over a 60-year period, at an interest rate of  $2\frac{1}{2}$ – $3\frac{1}{2}$  per cent. Not more than 10 per cent. of the total funds was to be allocated to any one of the 48 states.

The Act provided for two types of national subsidy. The first, in the form of capital grants, was never used. The second was in the form of annual contributions in amounts necessary to insure rents comparable to rents in local slum dwellings. Since, as a result of variation in local rents and building costs, a fixed cash limitation was not feasible, the contributions were limited to a percentage (maximum  $3\frac{1}{2}$ – $3\frac{3}{4}$  per cent.) of the building and development cost, excluding land purchase. (The amount paid generally has been less.) Payment of contributions was contingent upon the "elimination or repair or improvement" of a number of unsafe or insanitary dwellings in the locality substantially equal in number to the newly constructed dwellings. The localities provide at least 20 per cent. of the amount of the Federal subsidy, but this could be in the form of tax exemption.

For loans to local authorities \$800,000,000 was made available. Interest has, of course, been paid on all loans made; and the total cost to the Federal Government up to June 30, 1943, was approximately \$25,000,000 in subsidies.

Building costs (excluding land) were limited to \$4,000 per family dwelling unit and \$1,000 per room, except in cities of more than 500,000 population, where \$5,000 and \$1,250 were the maxima.

#### accomplishment

There was no longer need for direct Federal action. Ten months after the United States Housing Authority was formed, 200 Local Housing Authorities were in existence. These Authorities are semi-autonomous municipal non-profit corporations whose members are appointed under the law of an individual State. They can borrow money (without involving municipal credit), purchase land, exercise the power of eminent domain, and carry on all the activities necessary to a locally initiated housing programme, from site selection to management. Authority property is automatically tax-exempt, though payments for municipal services may, as a rule, be made "in lieu of taxes." Members serve without pay, assisted by a paid staff.

In its pre-war programme, the

United States Housing Authority aided in the construction of over 100,000 family dwelling units. In 1941 the rehousing of slum families was taking place at the rate of about 5,000 families a month. At this time average "shelter rent" (excluding utilities) varied from \$6.50 to \$16.50 per month, generally depending on the area and size of the city in which the project was located, and the national average of rent plus water, gas, electricity, and heat was just under \$18.00 per month. Rent is always comparable to the rent in slum houses in the same locality, and tenants come from substandard dwellings. The average income of families housed ranged from \$545 to \$1,000 yearly, depending on the locality.

At the beginning of the United States Housing Authority's programme, equal rents were paid for "equal" accommodations in each project—generally with the size of the dwelling unit the only basis for comparison. But later, in order to spread the available subsidy as far as possible, "rent grades" corresponding to three or four income ranges were established. This is a variation of the English (Leeds) system of "differential rents." Sometimes, within grades, rents were adjusted according to amenities provided—such as view and nearness to transportation.

Building costs were well under limitations established by the Act. The Agency itself set a maximum for each administrative Region in order to make the greatest possible use of regional differences in prevailing building costs.

Reasonable economy certainly was desirable; but as the programme proceeded, there was more and more emphasis on cutting initial cost. This did not accrue to the long-range interests of the housing programme. The results of ill-advised economy began to show in lowered space standards and in maintenance problems as well. However, masonry continued to be used and the buildings are structurally adequate. Mechanical equipment generally is excellent.

It was only partly the fault of the Federal and Local Housing Authorities that projects were too little integrated with community facilities—schools, parks, and playgrounds. Very few localities had made official plans; and town planning was most often thought of in terms of "zoning," which tended to freeze existing land uses, and static "master plans" that emphasized traffic and civic monuments. But, in addition, ill-advised economy affected site selection as well as construction. Those who felt that the high cost of slum land should not be absorbed in a building programme, as well as those who wanted to clear the slums at any price, sometimes lost sight of the relation between housing and progressive town planning.

Generally an attempt was made to separate the projects from their surroundings, and this has been one of the chief objections to the projects. Most of them have some community space—a meeting hall or craft rooms—(sometimes provided by converting dwelling units when the buildings were completed); and occasionally these facilities—usually inadequate—are shared with the neighbourhood. Less often, community facilities have been provided by the localities.

The majority of the projects are direct slum clearance schemes. Most of the plans are based on some variation of the super-block, made to fit existing street patterns. The *zeilenbau* site plan (parallel open-ended rows with all dwelling units facing the same direction) was particularly popular, but not always logically or humanly used: sometimes the reason for its original development (the provision of good orientation to sun and wind for every house) was forgotten. In large standardized developments, particularly on flat sites, *zeilenbau* frequently proved too rigid to be agreeable. And with row houses, front yards that abutted back yards became a problem. Over 80 per cent. of the dwellings are in houses (usually row houses) or two-story flats. Most of the rest are in three-story walk-up apartments. Elevator apartments—from 6 to 10 stories high—were used in New York City only.

By 1940 the funds originally appropriated to the United States Housing Authority were nearly all allocated. There were more than 500 local housing authorities in existence; applications for funds doubled what had been expended and proposals for additional appropriations were before Congress.

#### transition

But now defence was in the forefront. People were thronging to cities of war production activity, where severe housing shortages had been apparent as early as 1939. No additional funds were appropriated for slum clearance, and money not definitely committed was reallocated under an Act of June, 1940, to be used for housing families of enlisted men and workers required by defence industry. Restrictions with respect to the incomes of families housed and the elimination of slum dwellings were relaxed. Local initiative was not required: projects might be initiated by the United States Housing Authority and the War and Navy Departments as well as by local authorities.

A good start was made; the U.S.H.A. got 10,000 war-workers' homes under way in short order. But as the housing crisis grew, and it became obvious that a huge unprecedented programme would be needed, money for housing was allocated to other Federal agencies. Jurisdictional disputes among them, and controversies as to public versus private initiative—all reflected in Congress—complicated the picture beyond any possibility of brief description. The appointment of a Defence Housing Co-ordinator (who was without real power) who "programmed" needed housing construction and available materials merely increased the difficulties and frictions. Nevertheless a remarkable number of homes actually were turned out amidst the turmoil, including some of the worst and some of the best designed large-scale housing yet produced in this country.

By the end of 1941, 16 different Federal agencies were involved in war housing. Chief among those concerned on the publicly owned houses were the United States Housing Authority, the Public Buildings Administration, the Navy, and the Public Works Administration's Division of Defence Housing.

(This last was responsible for some of the best war housing design produced. Its architects were carefully chosen and allowed a good deal of freedom.)

Since 1934 the Federal Housing Administrator had been insuring home mortgages of private lending institutions, in order to stimulate privately financed new construction. The F.H.A. does not lend money and does not build houses. It is an insurance agency which protects banks, building and loan associations, life insurance companies, mortgage companies, and other qualified lending institutions against loss on loans made to individuals or companies for the construction or purchase of residential structures, or for their repair or improvement. More than 1,250,000 family units have been financed under F.H.A. insurance. These meet the standards established by the F.H.A., both with regard to construction, room sizes, location, and site plan. Prices range from under \$2,000 to a maximum of \$16,000.

The F.H.A. also insures mortgage loans up to \$5,000,000 (80 per cent. of valuation) on limited dividend corporation developments.

The considerations beyond actual requirements which were suggested to builders, and which entered into the review of plans, embodied distinct advances; and while the *minimum* standards allowed did not in themselves assure satisfactory house or site plans, these generally have been better than what was done before; and adequate construction was assured.

As part of the war housing programme the F.H.A. continued its mortgage insurance with more liberal terms (up to 90 per cent. of valuation) on houses built in war critical areas—maximum costs ranging from \$3,300 for each unit in a four-family building to \$6,000 for a detached one-family house. Conversion of property under the F.H.A. plan has also provided accommodations for war workers.

#### **national housing agency 1942**

In February, 1942, all non-military urban housing activities were brought under the National Housing Agency, created by Executive Order of the President. Its function has been to supply housing absolutely required for in-migrants essential to war industry—first by the use of existing facilities (by means of "Share Your Home" drives), by conversion of structures, and by building where necessary. The Agency carried on the struggle with Congress for appropriations and with the War Production Board for materials. Allocation of public and private construction to meet local needs is centralized in the Office of the Administrator of the National Housing Agency, which has established local war housing centres to sift applications for accommodations. New building is kept to a minimum; and private enterprise has carried on where the need for housing appeared to be a continuing one within the field which private enterprise normally supplies. More than half the war period's new residential construction has been privately built, largely with the aid of F.H.A. insured loans. Most of the "conversion" of existing buildings to increase the supply has been done with the aid of the Home Owners' Loan Corporation, a Federal loan

agency; while the Federal Public Housing Authority has had responsibility for public construction. This Authority inherited the peacetime functions of the United States Housing Authority and the Farm Security Administration's war housing and Greenbelt towns.

#### **the war programme**

In the last 3½ years, close to ten million civilians have been on the move in the United States. Many cities have doubled in size. New towns have been created; varying in size from, for example, Marin City, California (population 6,000) to Vanport City in the state of Washington (population 40,000)—both ship-building towns.

Houses had to be built. Shortages in essential materials were increasing. The need was for the largest possible quantity of adequate houses in the shortest time, at minimum cost in terms of materials, transportation, and manpower, without a post-war hangover of newly produced slums or abandoned ghost towns.

The lesson of the First World War was not well enough learned. Again, we often waited until labour shortage and absenteeism proved the existence of a housing emergency. The importance of community facilities (which should have been made clear by the experience of the United States Housing Authority) was largely neglected until it was demonstrated that they, too, are essential for an adequate and stable labour supply.

But the total war housing programme to date is no mean accomplishment, as may be seen from the following summary:—

Units in previously existing dwellings ...	1,900,000
New units built by private initiative with Federal guarantee (some for sale, not all occupied by war workers) ...	653,000
Family units ...	—
Public initiative (all rental, and reserved for "essential in-migrant workers") ...	614,000
Family units ...	—
Permanent ...	192,000
Demountable ...	75,000
Temporary (below normally acceptable living standards) ...	252,000
"Converted" ...	56,000
Trailers ...	39,000
Dormitory units ...	162,000

In March, 1943, more than three and a half million essential war workers—and close to eight million people—in nearly one thousand communities, were living in quarters mobilized under the war housing programme—somewhat less than half in previously existing structures.

By 1942 total construction of all kinds (including non-residential building) surpassed that of the previous peak year (1927) and more than doubled that of 1939. In view of the shortages of men and materials that existed, this represents a technical achievement. Co-operation among National and local governments, labour, and industry was an important factor, as well.

Many of the public housing developments built during the war are better planned than previous ones. Rigid site planning conventions have been modified to make the best use

of both natural and man-made environment. Often a nucleus is achieved in community buildings, while at the same time projects are integrated with surrounding areas.

At the beginning of the war programme, permanent housing with standards close to those established in the pre-war period was provided where it was considered that the need would be lasting. In order to facilitate acceptance by localities which did not foresee a post-war need, and to create salvage value, "demountable" structures were introduced. These were built of various types of prefabricated panels; but the degree of prefabrication and actual "demountability," i.e. remountability or salvage value, varied considerably. At the outset of the programme, a test was made by demolishing and re-erecting a single house of each of several types used in one development, and the results were judged satisfactory. Only in one instance have demountable buildings (79 structures, 200 dwelling units) been moved for re-use from one locality to another (200 miles away). (Factory completed mobile houses, introduced later, have been moved in several instances, often more than once.)

By the autumn of 1942 the use of critical materials had been stringently cut; and as a result, standards of space and amenity had to be reduced. By now it was apparent that large-scale removal and re-use of war housing would not be an important factor, and that "demountability" had to be paid for. From this time on the public programme has consisted almost entirely of "temporary" dwelling units, for which standard plans were developed by the Federal Public Housing Authority in order to facilitate materials allocation by the War Production Board. Where possible temporary projects were built on leased sites. The accommodations provided would not be acceptable for long-term use. Private Federal Housing Administration-insured construction has, however, been allowed to continue with more normal standards since it is for permanent use. Nevertheless, here, too, critical materials have been drastically cut.

The temporary dwelling units represented a definite saving in both cost and critical materials used. Methods of construction have varied. Prefabrication has been used for probably not more than 10 per cent. of these.

Despite two decades of experimentation, few methods of prefabrication reached substantial production before the war housing programme started. None had found the large-scale market which some people held would prove the economy of factory assembly as compared with conventional site assembled buildings. The Federal Works Agency's Division of Defence Housing, seeking demountability, was the first public housing body to accept or encourage prefabricated construction for urban use.

It is impossible from our war experience to draw conclusions with regard to the comparative economy of prefabrication. Manufacturers covered themselves against unforeseen problems which might arise in large-scale operations, and against probability of a temporary

market. For this reason their bids were by no means reliable figures on which to gauge costs. Moreover, the special requirements of demountability, when taken seriously, added to the costs considerably. Probably a more important factor than prefabrication itself in the reduction of building costs is the "rationalization"—systematic economy in materials and handling—that prefabrication makes possible.

A very important advantage of prefabrication to the war programme was its use of factory labour outside of war-affected areas, avoiding additional congestion and labour shortages. The reduction in labour and materials required at the site, and the simplification of site operations, also increased the speed of construction on large-scale developments immensely.

To sum up—prefabrication proved itself for relative demountability, for minimum labour at the site, and for speed—all special virtues in war-time; but economy in either first cost or upkeep has not been proved.

#### **where do we go from here?**

As many people have been involved in war-time migration in the United States as in the evacuations resulting from bomb destruction in England. But much of the industrial development which has taken place here during the war simply reflects a normal trend tremendously speeded up. Many of the ten million people who have moved during the war will not go back and start again where they left off. Ten million soldiers also may be asking, "Where do we go from here?"

And at least a million people are living in temporary war housing built according to standards of space and dwelling design and amenity *which should not be preserved*. Many of these will want to stay in the localities where they are now; some may move on once more.

A part of the war migrant families come from the ill-housed third. Very few of them ever lived in new housing. Rationalization of building may reduce costs, but it is hardly to be expected that private enterprise will be able to take care of all these families.

Only about one per cent. of 10,000,000 families who lived under substandard conditions before the war housing programme of the 'thirties had been supplied with new housing prior to the war. Certainly this is a small number. But in terms of funds it had available, the United States Housing Authority was successful. Our war experience has shown that a vast programme on a national scale is feasible.

Data gathered in connection with the programme of the Public Works Agency and United States Housing Authority show that new private construction is stimulated by Government slum clearance. We know that private and public building have prospered together in England. With regard to post-war planning and housing policy we must look to England, too; for again she is ahead of us. But in the United States as well, it is recognized that if public and private enterprise co-operate in planning for the post-war period, there will be a place for both in the tremendous housing job that remains to be done.





U S WARTIME HOUSING : WITH ONE HUNDRED  
AND SIXTEEN ILLUSTRATIONS AND A TEXT  
WRITTEN FOR THE ARCHITECTURAL REVIEW BY  
**RICHARD SHEPPARD**

# WORLD WAR 1 TO WORLD WAR 2

A study of American war-time housing confirms the belief that housing is first of all an economic problem, and only secondly a technical one. America, headquarters of private enterprise for the last twenty-five years, believed that it could provide adequate homes for all her population. She went on believing it right up to 1933—except for a short while at the end of the last war. We made the same mistake over here too; we had subsidies to encourage house building but it was not until 1924 that we got anything which made slum clearance possible. And then we made mistakes. War conditions have accentuated the pre-war shortage in America which was estimated at 11,000,000 homes in 1939. Little had been done before although what there was is of a high standard. But the temporary housing which has been provided since shows the thoroughness which America can bring to her production problems. She is not making our mistake of imagining that the supply of houses solves the housing problem. The biggest lesson we can learn from her is that a community must be planned, must include in a coherent pattern all the essential services. It must not be just an estate "laid out" like a cadaver.

The first and largest emergency housing scheme of the last war was at **Yorkship Village**, Camden, New Jersey (1918-1919), Electus D. Litchfield, architect, **2 and 3**. It is deliberately "beaux arts", with axial vistas radiating from a central square. The site is flat but the use of a curved continuous road system for the housing suggests contours. It recalls British garden city planning and breaks away decisively from the native American gridiron pattern.

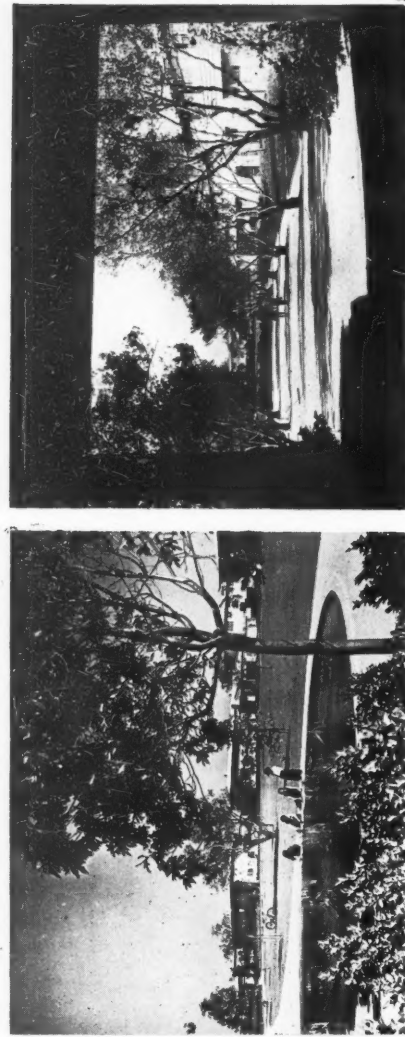
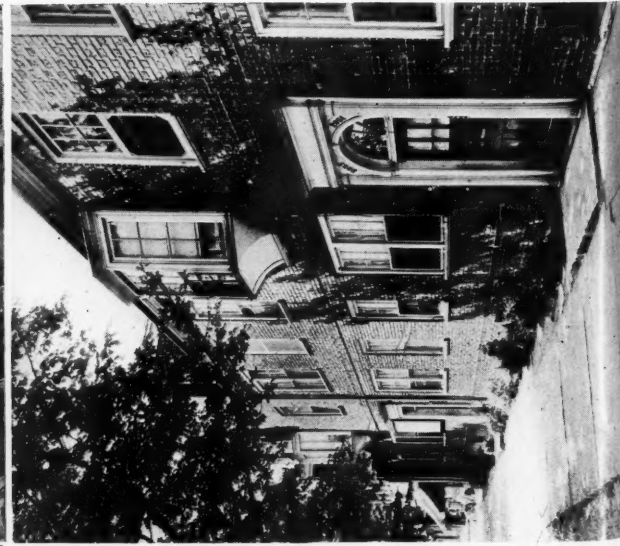
Considering the circumstances at that time it is a surprising piece of work; it is more domestic in scale than our own projects, and the centre of the town is well defined. It does not sprawl. The main roads meet at acute angles but the subsidiary junctions are well planned for traffic.

Most of the housing is brick built in the colonial style. It has a busy, urban air and is a little more flamboyant than the Georgian style which is safely established as good practice in our own Garden Cities. The large concrete paving stones which form the sidewalk form a contrast in scale with the brickwork.

Up to the time of the depression the Government then forgot about housing so far as legislation is concerned. The Housing Division of the Public Works Administration was started in 1933. At the outset it was mainly concerned with the arrangements of loans to Public Utilities. Some of its best work was in slum clearance where a very high standard of planning, layout, finishes and equipment appears to have been set up. The **Lakeview Estate**, Cleveland, **4** (L. Weinburg, chief architect; William H. Conrad and Wallace G. Teare, associates) was planned to replace a bad slum area.

The residential blocks are placed parallel to one another and at right angles to the service roads. Internal communication is by footpaths which are disposed quite informally through the communal gardens. The overall density is sufficiently low for the turf to survive. The planting also appears to be well arranged. Evident in the whole American effort is the desire to preserve and build amongst trees. The design is somewhat dull in spite of the relief provided by the projecting balconies which seem to be rather heavy for the facade.

The **Carl Mackley Houses at Philadelphia** are much more successful in this respect. The balconies are recessed and enclosed by a light steel rail and the windows look as if they lit the rooms behind



the Resettlement Administration was formed to provide relief works, it built, amongst other things, three greenbelt suburbs. The most successful and largest is **Maryland, 6 and 7**. It was planned by Hale Walker, and the architects were Douglas D. Ellington and Reginald J. Wadsworth. It housed originally 1,000 families, but that total has been doubled since the war began.

It follows Radburn closely in adopting the super block principle and keeps the traffic away from the residential blocks by means of the cul-de-sac. The town is set in beautifully wooded country which rises gently from a small lake to form a crescent of hill on which the housing is placed. The roads follow the contours and the housing therefore is generally placed across them. In the centre, equally convenient to all parts of the town, is the shopping and community centre. Access to the town from the outside is good and road connections adequate, safe and easy. The plan gives the impression that it is a careful equation between human convenience and the natural features of the site. It is organic: Yorkship village is not. **1**

Some of the planting effects in these towns and settlements are lovely; even those hurriedly designed as part of the Defence programme, preserve if they cannot plant, which is more than we can say of some of our own schemes.

**Baldwin Hills Village, 8 and 9** (Reginald D. Johnson and Wilson, Merrill and Alexander, associated architects; Clarence S. Stein, consulting architect), was one of the schemes which were subsidised by the Federal Housing Administration, which encouraged private enterprise by insuring first mortgages for houses costing up to 16,000 dollars. The buildings themselves are not very interesting but the setting and the planting show yet another aspect of the pleasures of Los Angeles. The layout is gentle and informal, the planting spacious and varied. The full effect of such planting must wait upon the growth of the trees.

But this happy state of affairs does not always obtain. In some cases the site itself is a snag. This applies for instance to **Sunnydale, near San Francisco, 9**. (Albert F. Roller and Roland I. Stringham, architects). The estate settles down on the slopes of the hill to look across at the factories. The two-storey houses themselves are reasonable, but the monotony of arrangement, the uniformity coupled with high density, does not suggest that it has been very successful. The terraces are placed at an angle to the service roads and this arrangement needs adequate planting to close the vistas.

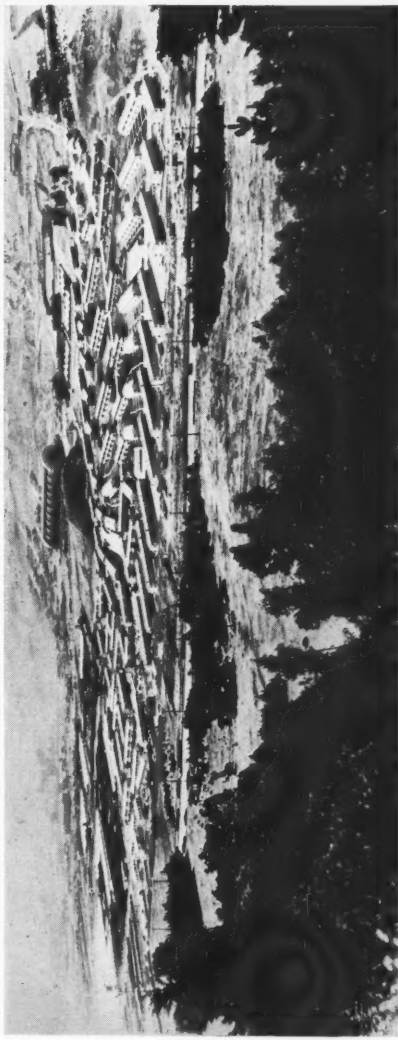
Of a different order is the work of the Farm Security Administration which was set up in 1937 to help the farming industry. The F.S.A. shows that even bureaucracy, when it gets the right men, need not play safe and can plan, design and initiate along progressive lines. In California it designed and built two highly successful Farm Workers' communities at **Woodville and Yuba City**, under Burton D. Carns and Vernon DeMars, as chief architects. Of the first the clinic is illustrated, **116**, of the second three examples of houses and the community centre, **11 to 14**. The layout shows that the settlement is divided into two sections—one for the permanent farmers and the other for the migratory workers. The permanent homes are two-storey buildings and surround the magnificent grove of pecans in the foreground. The prefabricated metal houses for the migratory workers are not so fortunate. Each group is arranged around a central grove of trees. This provides convenient access to the communal and social buildings which are located in the centre as well as giving a cool vista to each house. There is a well organised, and well planned, community service, and the community centre, **14**, is a really distinguished building. Each part of the plan is clearly expressed in three dimensions, and the functional requirements form an integral part of the design. Even the ventilators in the roof help to accentuate

together with their surroundings they form an excellent example of a newly regained concern for the relationship between architecture and its natural surroundings. Their appearance is closely related to the local conditions, and they are designed for comfort in a mild climate with almost tropical summers. Living room and kitchen are on the ground floor and the three bedrooms above. "Instead of windows the sleeping floor has two rows of doors, the doors are on the ground floor and the three bedrooms above."



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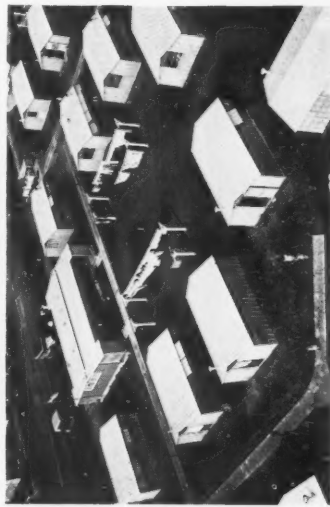
together with their surroundings they form an excellent example of a newly regained concern for the relationship between architecture and its natural surroundings. Their appearance is closely related to the local conditions, and they are designed for comfort in a mild climate with almost tropical summers. Living room and kitchen are on the ground floor and the three bedrooms above. "Instead of windows the sleeping floor has two rows of flaps, the lower of plywood, the upper of translucent glass substitute. The south side of the houses is protected from rain and summer sun by an emphatic roof overhang and by the projection of the second storey over the ground floor. Faced with silver grey asbestos cement boards, the long rectangle of the upper storey seems to hover lightly over the dark, unpainted redwood below." One might also add, without being unduly ecstatic, that the gardens have now been planted with crops and shrubs and the Libyan desert effect has disappeared. The trees make a contrast to the horizontality of the terraces, and the rhythm of the fenestration is helped by the polychrome effect between the ground and first floors. The design of the steel huts for the migrant workers is equally ingenious. The arrangement of the paths, 14, shows the help which a good climate can give. It is not necessary to take them to the huts. The only glazed window is at the gable end and each hut is so arranged that there is a view from this window across a small square where the well-designed washing standards are fixed. Light and protection from the sun are also offered by the hinged metal flaps along the long side of the huts which are let down when they are unoccupied; it is an ingenious contrivance. A communal bath house and laundry unit is also shown and a similar unit is illustrated, 17. These are now standard equipment in all trailer housing schemes.



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which seem to be rather heavy for the facade.

The Carl Mackley Houses at Philadelphia, Pennsylvania, designed by Henry Wright as the architects. It was, as the exhibition put it, an earnest attempt to adapt English garden city principles to U.S. conditions. Unfortunately, to an even greater extent than Welwyn, it became a dormitory suburb.

It had more excuse; there was no agricultural zone established round it and little industry. In certain respects, however, the plan marks an improvement. It is divided into "super blocks" which are based very largely upon the school unit. While traffic routes are provided, care is taken that the automobile does not penetrate too far. Not only is the cul-de-sac adopted, but the parallel residential block, with roads at right angles to the blocks, is also employed. The continuous strip park, with tunnel connections under the roads, has been used and the town is well planned for pedestrians. Later on, in the depression, when

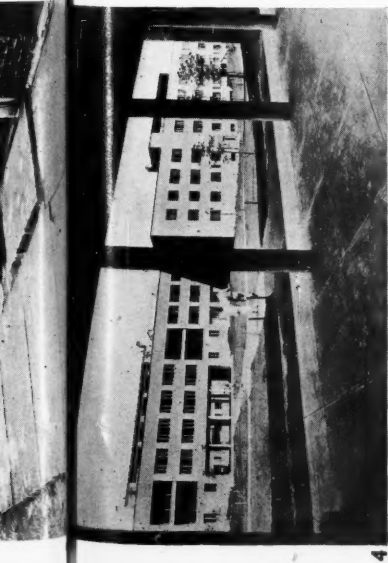
The Garden City movement had a great influence on American ideas of the planned community. In 1928 the first garden city was planned at Radburn, New Jersey, with Clarence S. Stein and Henry Wright as the architects. It was, as the exhibition put it, an earnest attempt to adapt English garden city principles to U.S. conditions. Unfortunately, to an even greater extent than Welwyn, it became a dormitory suburb.

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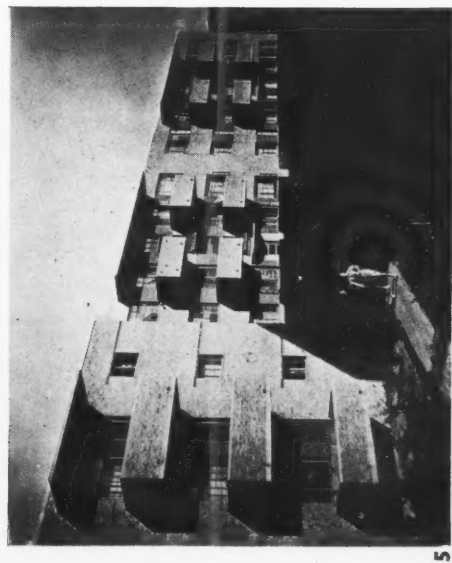
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# WAR HOUSING: REQUIREMENTS

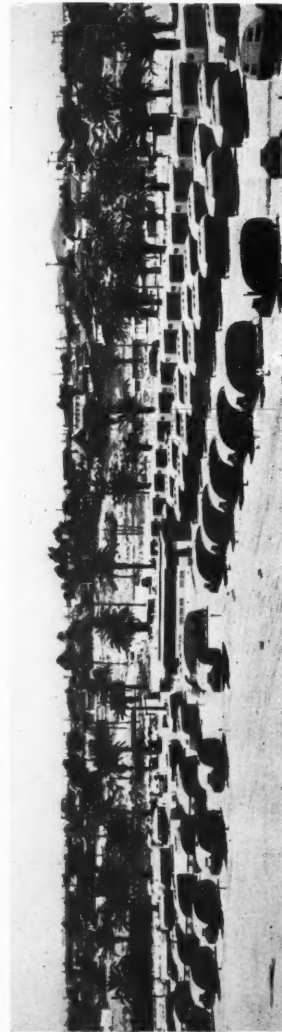
When the lights went out for world war 2 America had done very little towards the solution of her housing programme. What there was, as a result of the Federal Housing Agencies, was good, but a drop in the bucket. At the start of the war, when it seemed as if America's role was to be that of the bottle-holder in the corner, who urges his man to stand up and take it, it was realised that the production of war weapons would aggravate the housing shortage. British capital poured into the U.S. on its last voyage, and the extension of existing armament plants and the construction of new areas was begun. Workers moved into the towns and cities already loaded up with a housing shortage. As America moved slowly towards war, with the passing of the Lease Lend Act, the problem became more acute and widespread. President Roosevelt in a message to Congress said:—

"This war involves a total national effort and industrial mobilisation. Industry cannot effectively mobilise and plants cannot expand with sufficient rapidity unless there are enough houses to bring the worker to the job, keep him on the job, and maintain his efficiency and morale. . . . " Consistent reports from all over the country indicate a rising need for housing, running far ahead of the supply and threatening seriously to reduce the effective use of these plants unless remedied at once."

As the Germans sliced up Western Russia, the Japs struck at Pearl Harbour, and the Americans mobilised at last, the defence housing problem grew, with every machine and weapon. The sixteen Housing Agencies set up by the Federal Government were fused into one. Programmes were drawn up, to be administered locally as far as possible.

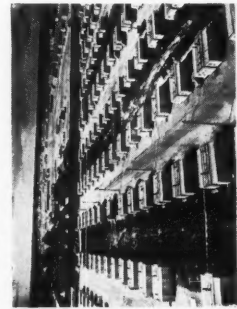
In January, 1943, Jacob L. Crane, Director of Urban Studies for the National Housing Agency, estimated that 3,000,000 dwelling units would be needed in the following six months for workers moving on to war jobs. In 1942, 278,000 new units had been completed. Altogether well over a million new units were then being started.

The difference between the requirements of 1944 and the achievements of 1942 is startling. But, like munitions, a large housing output takes time to organise. The succeeding pages show how new housing units were provided—from the trailer caravan to the permanent house. An enormous number of homes were also made by reconditioning existing buildings and by the conversion of large, obsolete mansions. We are still hesitating about this method of providing homes but we should at least try it as a temporary measure.



15

## TRAILER HOUSES



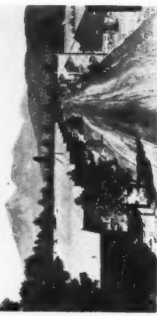
16

The trailer camp like that shown, 15, at San Diego, California, marks the later phase of the development when the Government had stepped in. Preceding this control, Klondike conditions had arisen round the new plants where everything from old cans upwards was used for housing. Trailers were not intended to be occupied by one family for more than six months, while permanent housing, whether of prefabricated or of *in situ* construction, was rushed up by both state and private enterprise. The trailers could be then moved to other locations. The service connections made to them could be used for the permanent houses. But the sites were not selected with this end in mind. The trailers were of two types: fixed and expanding. They were used in the proportion of four to one. Both are illustrated. They were built entirely by private enterprise. Special trailers or temporary buildings were provided for child care, as health clinics, for

to reduce the cost of roads and services to a minimum. That at Willowcourt, 16, is an example. Although it is monotonous in appearance it shows that America can improvise; can

as the layout at Vallejo, California, 19, where the designer apparently decided that as they were demountable, siting was unimportant. There it stands, a desolate warren of buildings on a desolate hill. The photograph is probably unfortunate; the location was probably correct in relation to industry. With our own problems in mind, look and consider and do not forget. The contrast it makes with the settlement at Oakdale, 20, where the houses are set amongst the pines, shows how essential is a well-wooded site. The detail in the houses at Challas View, 21 (Hamill and Hope, architects) shows what can be achieved with prefabrication by efficient detailing. University Homes at Portland, Oregon, are part of Vanport City, built to house workers for the Kaiser Shipyard and with a total population of 40,000. The layout of the houses, 23, around a small internal court saves land and gives some light and air, but concentrates noise. But the quality of these demountable houses varies. By our standards they are well equipped; until recently we have developed space at the expense of equipment. There is a lot to be said for this attitude—if it is deliberate.

## TEMPORARY HOUSES



Demountable and other temporary houses formed a good part of defence housing, and over a quarter of a million were built. Their removal is assured by law after the war, so that they have certain other points in common with the Portal bungalow. The plans allow for both one and two storey schemes, although the latter are generally flat plans superimposed on one another.

Their dimensions, when the fact that they are temporary is considered, are generous in room space and have a good standard of equipment. See the plans on page 39. The arrangement of the kitchen and living room in the two bedroom single storey plan is very interesting, and might be used in some of our own schemes; it gives a remarkable flexibility of living conditions. We have not tried this arrangement. The layout of these single storey houses is at right angles to the service road. This follows what seems to be an established American practice. Flagstaff, Arizona, 22 (Lescher and Mahoney, architects) and Hagley Downs, 24, show how this method of siting is carried out.



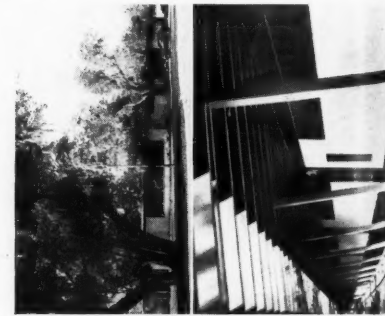
23, 24

## PRIVATELY-BUILT HOUSES

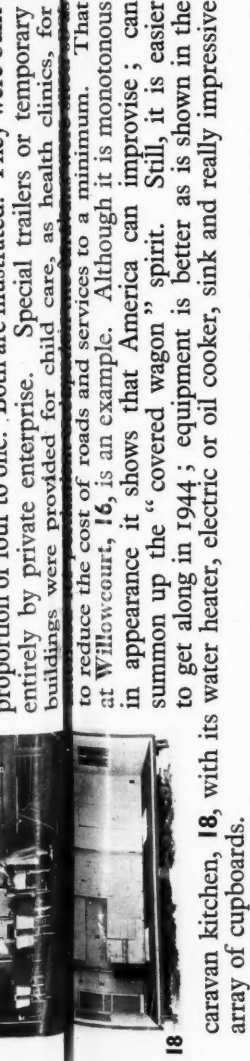
Naturally some firms were anxious to provide their own housing for their own employees. The scale of such enterprise was not large, as it was only permitted in critical war areas. There was also a price limit on the houses, and this had the effect of restricting both their size and their equipment. 25 Their architectural standards are on the whole pretty low.

The one conspicuous exception is Lake Jackson in Texas, of the Dow Chemical Company, 25, 26 and 27 (Alden B. Dow, architect). The vegetation to our eyes is fantastic, the buildings, half shadowed under the trees, are excellent. An inventive appreciation of the possibilities of construction is shown where feet of rafter supports are emphasized by revealing

for pattern and colour is evident in the cool-looking houses under the trees, 27, with their deeply projecting eaves shadowing the clapping and the projecting wooden frames. Alden B. Dow gets considerable help from the Texas vegetation. William W. Wurster







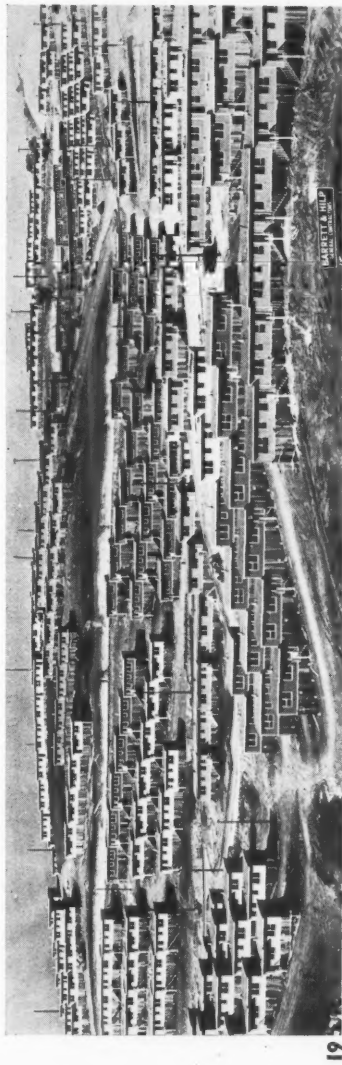
caravan kitchen, 18, with its water heater, electric or oil cooker, sink and really impressive array of cupboards.

The two types of trailer plan are shown on page 39. The expanding type, which is 8 ft. wide and 16 ft. long for transit, swells to an overall of 20 ft. by 18 ft. with four curtained room spaces. The other type is 22 ft. by 7 ft. 6 in., and sleeps two.

All the units for these trailer camps show tremendous ingenuity and skill in providing the kind of equipment that is necessary to keep the American worker at his job.

The plans on page 39 of the toilet trailer, with its w.c.'s, baths and showers for both men and women, is entirely self-contained and houses its own water heating apparatus; even the office has its own private lavatory. The laundry is very well equipped with sinks, two washing machines and eight iron boards. All these plans are variations of a basic type. Sometimes the laundry unit, 17, is not enclosed.

Equipment of this standard has not been made in England since the beginning of the war. Maybe those girls who have married American G.I.'s are thinking of their future.



19

## DEMOUNTABLE HOUSES

After Pearl Harbour all efforts to co-relate duration houses with post-war requirements were given up. The supply of critical materials contracted and America found herself in the same position as we were—although there does not appear to have been the same stringency. But with the abandonment of any idea of building permanent houses, arose the problem of what was to be done after the war with the dwellings built during it. In certain cases they would be needed where they were erected, but in many cases they could be moved with the population, whether back to the old cities or to new areas with new industries. Anyway it was an attractive theory. At first it seemed "a magic word to banish the boggy of post-war ghost towns." But demountability proved expensive; a prefabricated system of construction may be cheap and easy to erect, but it is not necessarily as economical when demounted for re-erection or for scrap. And all the services that have been installed are wasted. So demountability ceases to be current and what was frankly called temporary housing—which is an easier word—has been adopted. But the effort towards demountability had an effect; it had simplified constructional methods and helped a little towards the rationalisation of building methods.

For what comes down must go up, and a consideration of the second process improved the first. It also taught the prefabricators a lesson—no later scheme is quite so poor

37

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27

## DORMITORIES

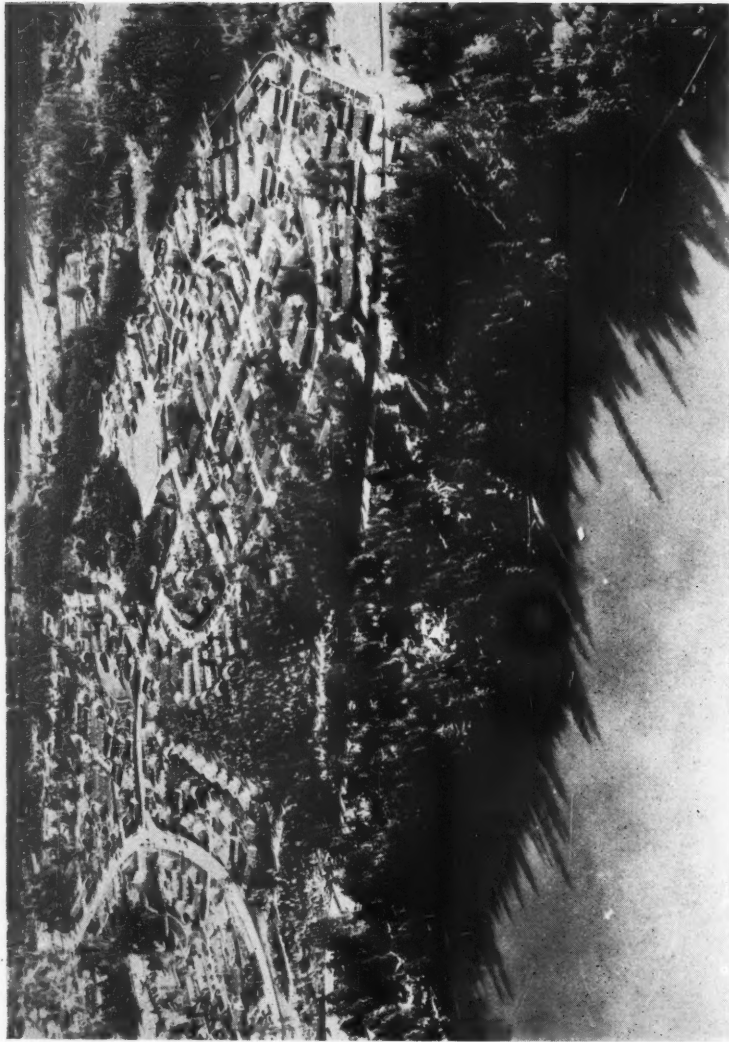
In this country the Ministry of Supply realised at an early stage in the war that some of the big ordnance factories which were being established would only hold and keep their workers if they gave them attractive quarters. The majority of the schemes were remote from towns, and as most workers were mobile the hostel system was chosen. It had the advantage of providing accommodation without making too great a tax on the building industry; it was also cheaper. Fortunately some of the schemes were entrusted to W. G. Holford with the result that we had some wartime building which in layout and design will provide a peacetime standard.

The Americans have concentrated more on the single family unit than on dormitories or hostels. A number of them have been built and generally they are similar in their organisation to our own except that they seem to prefer the two-storey type. Two or three dormitory blocks radiate from a centre unit where the sanitary units are located. This arrangement not only allows for variations in block plan, but for changes in level across the site, 29. The scheme at Washington, Vancouver, is of masonry, but that at Wilmington Hall, 30, is timber framed, and so is Charleston, South Carolina, 28. Canteen, shopping and social facilities are provided as part of the scheme. There is a big car park in the Washington scheme. This is a problem our hostel planners did not encounter; we use buses. It may be that these different social habits give the clue to differences in policy, such as our decision to build hostels, and theirs to go on with normal building types. It is more likely, however, that the mere fact that America had greater experience in prefabrication of small houses before the war, and a bigger labour pool, as well as plentiful timber, accounts for the difference.

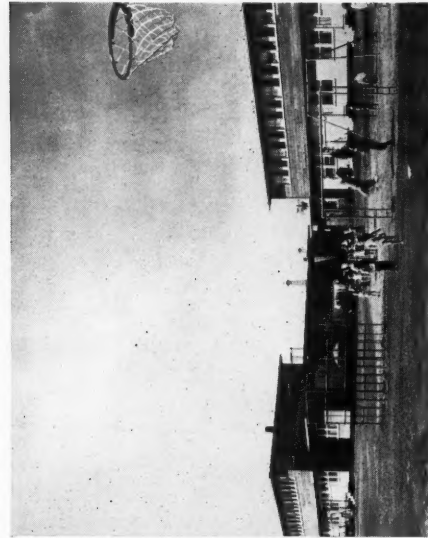
## PERMANENT HOUSES

The construction of permanent homes for national defence might be described as the American counterpart of our own pre-Dunkirk mentality. Obviously when a large housing programme has to be undertaken for military purposes it is only common sense to see if it can be made to tie up with the permanent post-war requirements. But total war requires ruthless planning and the greater demands which permanent construction makes upon labour and materials soon eliminated it.

The schemes completed show the influence of Greenbelt planning but have developed it more logically. All the standard features—the cul-de-sac, parallel blocks at right angles



31



(Grainger and Johanson, architects). It is an excellent scheme with the tremendous advantage of a good site. Why is it, we may complain, looking enviously at the bathing places on the lake, that such features are never provided in this country? The roads follow the contours of the land and the lake side is formed into a park by preserving a belt of trees, the houses being built amongst them. The community and shopping centre is in the heart of the estate and the arrangement of the roads should be examined in relation to the contours.

Normart Terrace, Los Angeles, California, 32 (W. L. Risley and S. R. Gould, architects) is an example of the way terrace housing has been developed. The parallel block system gives play-space right in front of the homes. The tradition of the private garden is not established in America, and these open spaces are tended by the local authorities. They are put to varied uses; gardens, parking spaces, and playgrounds show how useful this form of planning can be. The houses are dull; the overhanging first floor and deep eaves are necessary in the climate, but there is no need to divide the two floors in equal proportion. Neither does the glazing bar placed half-way up each window help matters.

Cameron Valley, Virginia, 33, illustrates a different tendency: single family detached dwellings, with a colonial flavour imparted by the wrought ironwork in the porches. The simplicity of the siting is helped by the trees, and from the photograph this looks a competent and spacious



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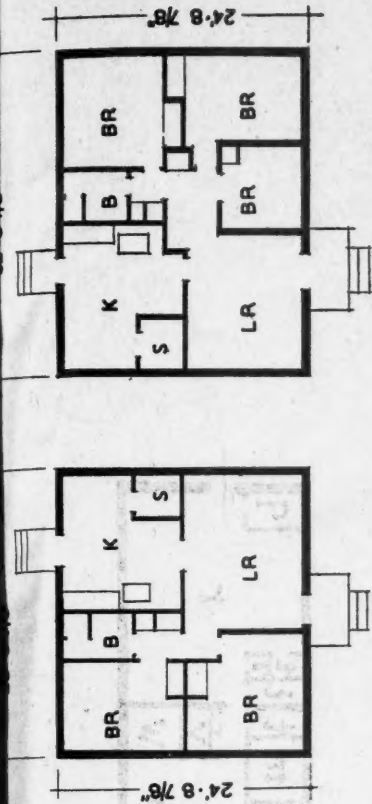
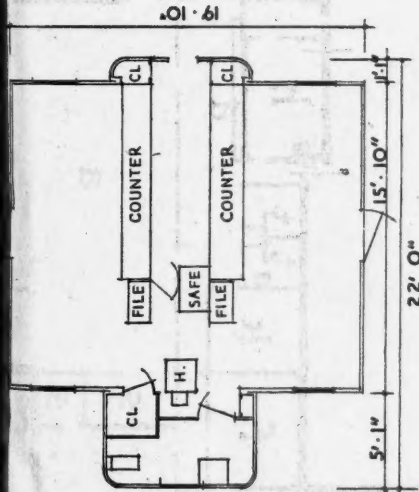
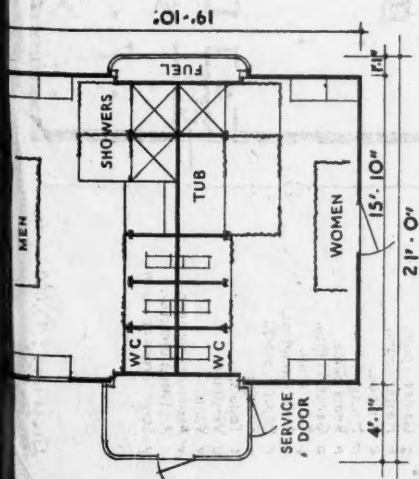


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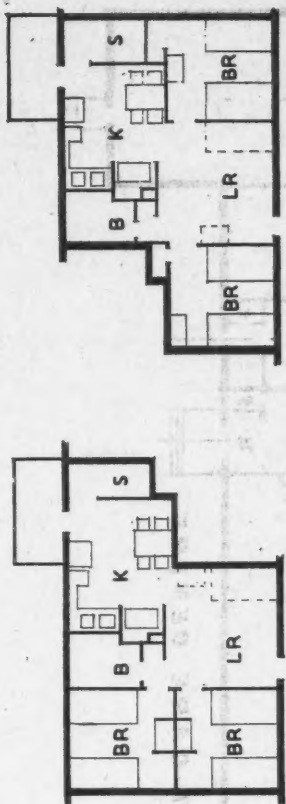
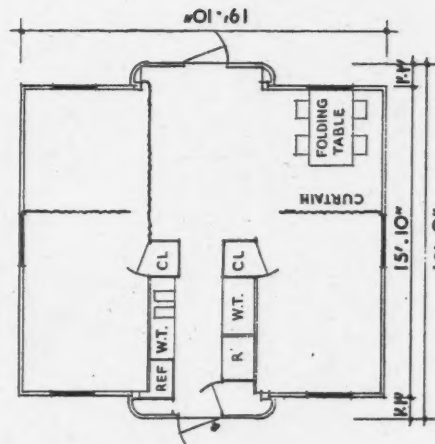
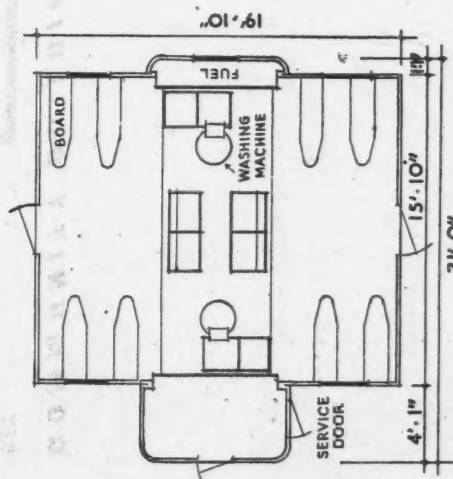
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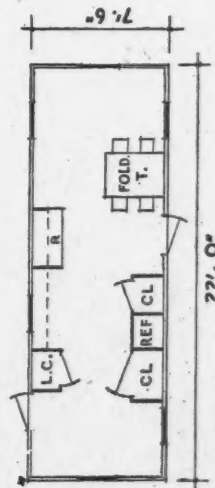




**DEMOUNTABLE HOUSES, FRAME CONSTRUCTION**

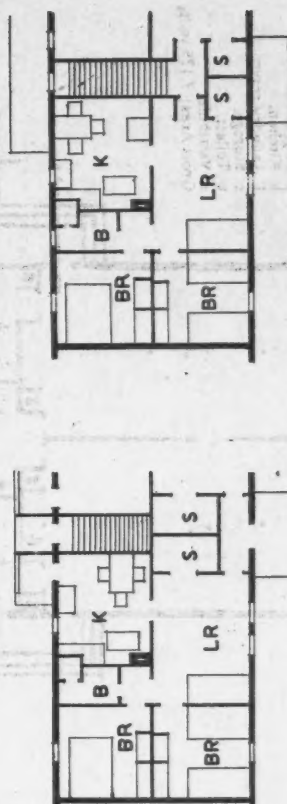


**TEMPORARY HOUSES, TWO VARIETIES**

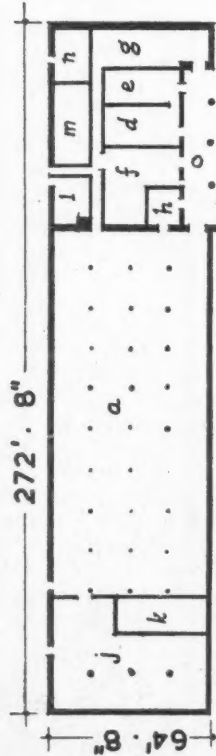


**TRAILER HOUSES**

- a Expandable Toilet Trailer
- b Expandable Office Trailer
- c Expandable Laundry Trailer
- d Expandable House Trailer
- e Expandable Type II Trailer



**TEMPORARY HOUSES, MAISONNETTES**

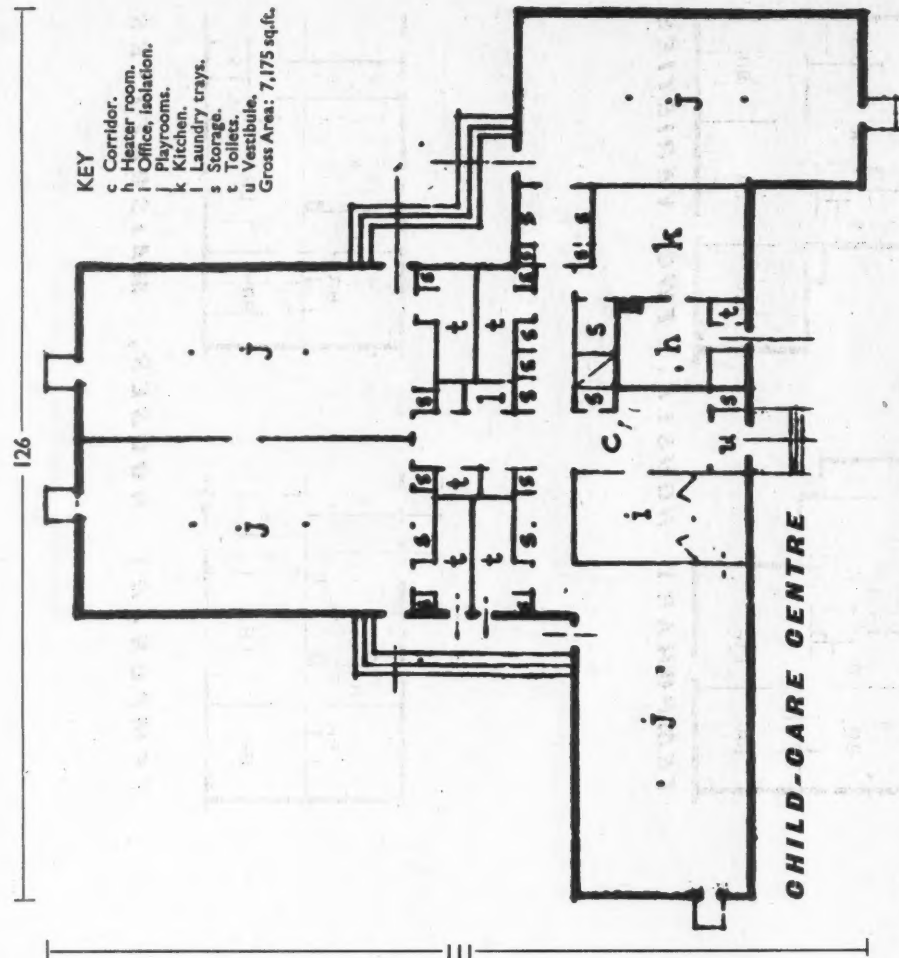


# SHOPPING CENTRE

## KEY

- a Foods, drugs and variety.
- b Beauty parlour.
- c Barber's shop.
- d Dry - cleaning, shoe repair, laundry, etc.
- e Lunch room.
- f Prescription booth.
- g Storage.
- h Refrigerator storage and compressors.
- i Heater and janitor.
- m Lockers and toilets.
- n Kitchen and kitchen storage.
- o Entrance porch.

AREA	
Foods, Drugs and Variety	12,288 sq. ft.
Small Shops and Services	3,224 "
Lunch Room	1,128 "
Gross Area	16,640 sq. ft.



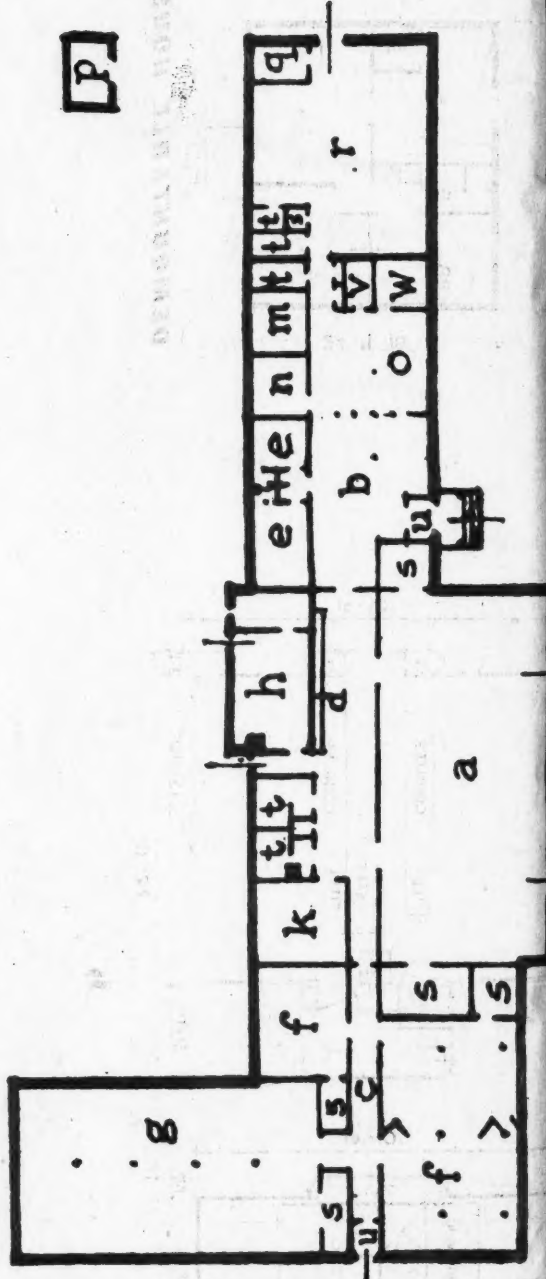
# CHILD-CARE CENTRE

## KEY

- c Corridor.
- h Heater room.
- i Office, isolation.
- k Kitchen.
- l Playrooms.
- s Laundry trays.
- s Storage.
- t Toilets.
- u Vestibule.

Gross Area: 7,175 sq. ft.

# COMMUNITY BUILDING



## KEY

- a Community hall.
- b Lobby, waiting.
- c Corridor.
- d Cloaks.
- e Clinic room.
- f Club room.
- g Games room.
- h Heater room.
- i Kitchen.
- j Manager.
- k Rents office.
- l General office.
- m Paint shop.
- n Superintendent.
- o Repairs, stock.
- s Storage.
- t Toilets.
- u Vestibule.
- v Vault.
- w Assistant manager.
- x Activities director.
- y Stage, dressing rooms.

Gross area : 13,000 sq. ft.





Gross area : 13,000 sq. ft.

13,000

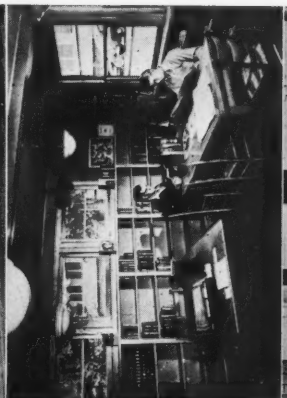
In the short years of the last peace we built our millions of houses in this country. But however

out of the construction, like most buildings in California, the intensity of the sunshine is broken by the polychrome effect of the materials. The scale of the building is kept by the steps running up to the entrance doors. The railings are constructed of simple rectangular





34



35



36

In the short years of the last peace we built our millions of houses in this country. But however well built and attractive the house and the estate might be, they were not always popular. Higher rents were partly to blame, but the absence of any social or communal facilities was also a contributing factor. The Government made a series of timid and furtive gestures by offering subsidies for physical training centres, youth centres and pre-natal clinics. Only in 1937 did it recognise the need for providing subsidies for full communal facilities and the opportunity of creating an active and vital social life.

Apparently America went through the same process. The housing projects at the beginning of the war were built with no communal facilities whatsoever. The architects proposed them but the official mind, as in England, only saw the end of its nose. But the Americans live more in public than we do, and it was not long before it was realised that housing without schools, without clinics, and shopping facilities, and without a communal focus, failed to attract and hold the worker. So acute the problem became that when such services went back into the programmes, they went back on a bigger and more complete scale than ever before. Their importance was recognised officially; and so far as their location in the estates and the design of the buildings was concerned, the architects made the most of them. One would be hard put to find half a dozen examples either of centres or clinics in this country which could compare with the American ones.

Typical plans of community buildings are given on page 40. The shopping centre from Fontana, North Carolina (T.V.A.) is handled in the commercial sense as are all the others, by private firms. It is divided into sections, one being the department store and the rest into smaller units for individual shops like beauty parlours, barbers, and a lunch bar.

The child care centre, Washington, D.C. (page 40), accommodates 121-155 children. It has four large playrooms, and in the centre of the plan are two sanitary and service sections. It is a rigid plan and extension would be difficult. The community centre (page 40) is more successful. It has a big auditorium and the areas are subdivided into:—

Management	..	..	..	..	1,400 sq. ft.
Maintenance	..	..	..	..	1,650 "
Tenant Accommodation	..	..	..	..	9,000 "
Clinic	..	..	..	..	400 "
Heating	..	..	..	..	550 "
Gross area	..	..	..	..	13,000 sq. ft.

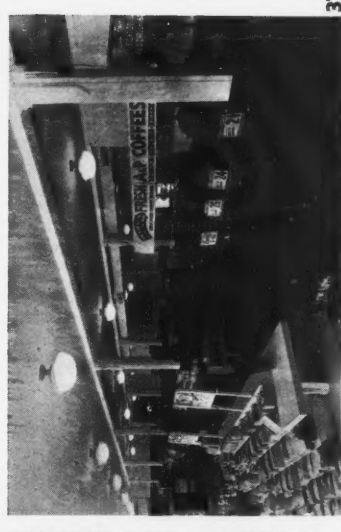
The community centre at Calvert, New Jersey, 34, is housed in an old building from which extensions have been made, and it has the great advantage of possessing a ready-made garden. But the interior attractions and equipment of these centres is what excites envy. Every taste, every activity from skittles to politics, is catered for, 35, 36. The library is from Fort Loudon (T.V.A.), and is of demountable construction. At Duration Village, Appalachia, 39 (Architect Roland A. Wank, Chief Architect T.V.A.) the siting of the bungalows amongst the trees is especially good, and the open character of the settlement is maintained in the details. The road, with its pleasant loose texture, the informal hexagon at the top, backed by shrubs, is a model for such development. The design of the buildings themselves with the dark toned clapboarding, deep white painted eaves and the unstylised arrangement of the windows is tranquil and effacing. Another good example in brickwork is that at Lily Ponds, 40. The cafeteria at Vallejo, California, 41 (Will. Wilson Wurster, architect) is one of the

41

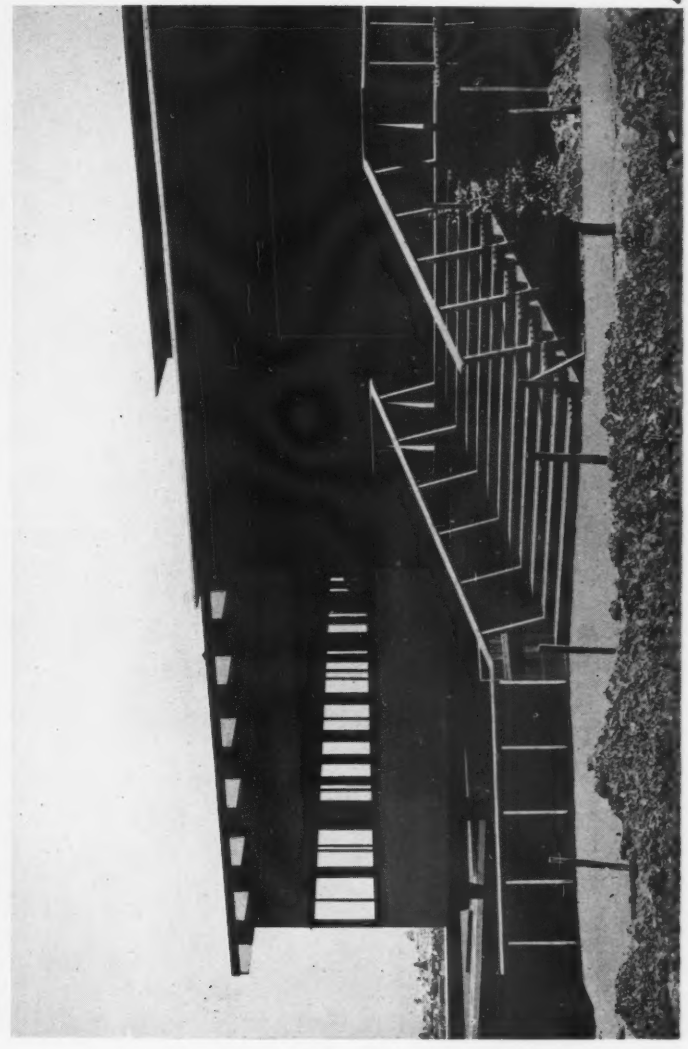
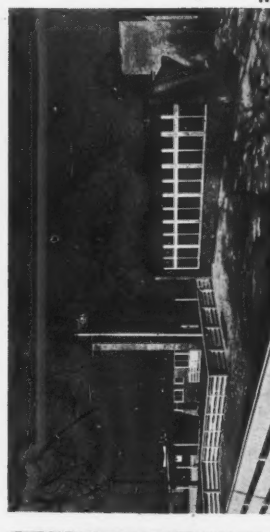
out of the construction; like most bungalows in California, the intensity of the sunbathing is broken by the polychrome effect of the materials. The scale of the building is kept by the steps running up to the entrance doors. The railings are constructed of simple rectangular sections and rely on the cant they have been given for their effect. The community centre at Kramer Homes, 37, and the shopping centre at Windham, 38, are nearly as good.



37, 38



39, 40



# THE ACHIEVEMENT UP-TO-DATE

At this stage, American architects and designers, manufacturers and constructors, knew what their problem was. They had plenty of experience in all types of building, using all types of materials. Prefabrication, except in so far as the trailer house was concerned, has not been used as extensively as had been predicted. In the trailer house, development has gone about as far as it can, short of some revolutionary development in construction, and the maximum of equipment has been crammed into the minimum of space. The experience gained in this type of construction is being applied to the permanent house. Houses—temporary, demountable, permanent—have all been experimented with, have been tried out in every climatic condition, in every setting. Prefabrication is being progressively introduced, particularly as the surplus labour is absorbed and the supply of materials tightened. More important is the realisation that no housing, whether temporary or permanent, can be considered as satisfactory, unless full communal facilities accompany it. These elements are so necessary that the word "facilities" should be dropped and "services" substituted; officials, the guardians of public money, are prepared to spend money on services. The prevention of diphtheria by inoculation, the pre-natal clinics for mothers, are surely as obvious a health precaution as the provisions of sewers and isolation hospitals. The scale of these services grows steadily, and some of the later schemes like that at Channel Heights show that their siting in relation to housing is being considered. In another direction, too, the short term housing programmes have been valuable. They have given American architects an opportunity of developing a great deal of skill in the planning and layout of towns, estates and communities. With 11,000,000 new houses required after the war, and what would otherwise have been a limited experience in large subsidised housing schemes, this is a great advantage. Already, it seems, America has much to teach us in this matter—particularly in new schemes in undeveloped areas; and it is only forty-four years since an American, Ebenezer Howard, produced the book which started us careering down the bosky avenues of the garden cities. We have not got beyond the garden city idea, in our official schemes, and the Americans have been able, since the war, to develop far beyond it. In other directions, in the social services they now provide in connection with housing, in the equipment and planning of the houses themselves, they surpass our achievements. That is not to say that we should set out slavishly to copy their efforts—differences in culture and social tradition are fortunately too marked to allow us to do so. The following schemes, Channel Heights, Cherry Point and Marin City, have been selected to show some examples of complete townships built for Defence Housing. The architects include men of the calibre of R. J. Neutra, and Marcel Breuer, whose work is of intrinsic interest, quite apart from its bearing on the development of American housing.

## CHANNEL HEIGHTS

Channel Heights, on the west coast of America, is in many ways the most mature and masterly project so far realised. It is of interest from a number of viewpoints: its layout on a difficult site; the use of modern equipment for earth shifting, which makes the layout possible and practical; and the planning and construction of the buildings themselves. R. J. Neutra has long been regarded as one of the most progressive and creative architects in America. In all his work he has shown a great eagerness to experiment with new materials and methods of construction. Every scheme of his seems part of a consistent development; and whether he has applied himself to prefabricating class-

constructional possibilities of materials, but in his efforts to find appropriate aesthetic forms. In Channel Heights, he was given an opportunity to apply his experience in a wider field, and the layout shows the way in which mechanised plant, bulldozers and excavators can be used to create an attractive environment.



ceiling and in the reduction of the amount of plywood, are noticeable.

The plan of the shopping centre is on the same principle as the one previously illustrated, although rather larger. It covers an area of some 10,000 feet and caters for all the local needs of the inhabitants. There is a large department store and a series of smaller shops connected with it. The photograph, 50, of the store part makes a very dramatic composition in spite of the simplicity of the materials. Timber boarding is used on the underside of the projecting canopy, and again—an original use this—for the stallboard. The simplicity of the treatment, only relieved by the lettering, focuses attention on the display counters inside the store.

There is another feature of the communal services at Channel Heights which should commend itself to us who are so horticulturally minded in our private lives and so indifferent to gardening outside them. The authorities provided for a garden craft centre, where instruction is given in planting and gardening, and seeds may be procured. As has been remarked, Americans are not so much inclined to cultivate their own gardens as we are, and this innovation is therefore remarkable—although the design of the building, 48, pleasant enough in itself, gives little indication of its purpose.

The houses are of three types, and their distribution is shown on the site plan on page 50. They are one-storey, two family units, two-storey flat units, and two-storey, four family units, arranged as duplexes. The second and third of these types are also shown on page 50. The planning of the two-storey house is very ingenious, and takes into account climatic necessities. The living room is entered through a projecting lobby and the stairs are opposite. A curved dining recess is placed at the end of 47 the living room nearest the kitchen into which it opens. The whole of the ground floor plan except for the cupboard space is thus open and makes for a movement of air. Upstairs two good sized bedrooms are provided, one with a sleeping balcony.

A large proportion of American schemes have only two bedrooms; the most common number over here. The appearance of these two-storey houses, 46, shows the way in which Neutra has avoided direct sunshine in the main bedroom by providing a balcony and carrying the main roof over it. These 48 houses, being arranged in groups of four, give scope for the bold and dramatic alteration of plane which provides the main interest. Cement rendering is used for the plain surfaces.

The duplex apartment (page 50) has the same open treatment of the plan and the recession of part of the facade, to give shade to the interior. The exterior harmonises well with the previous type, and it is clear that the organisation of the plan and the construction is similar, 49. The structure is described as pre-fitted, pre-cut wood frames. The balcony and other exposed woodwork is in that rich, lustrous redwood which is so much used in the west and south. All the roofs have a bituminous felt finish into which the same



science of his seems part of a...  
development; and whether he has  
applied himself to prefabricating class-

the west and south. All the roofs have a  
bituminous felt finish into which the same

constructional possibilities of materials, but in his efforts to find appropriate aesthetic forms. In Channel Heights, he was given an opportunity to apply his experience in a wider field, and the layout shows the way in which mechanised plant, bulldozers and excavators can be used to create an attractive estate on land unsuitable for other purposes.

Channel Heights is of permanent construction and houses 600 families. It is located in relation to a shipyard where most of the tenants are employed. The site selected for these 600 units is 165 acres in extent, so that the density to the acre is considerably lower than we give in housing of a similar type (see plans on page 50). It lies just outside the town of Los Angeles, and is connected up to the public parks of the city by continuous parkways. The site itself is about as fierce a proposition as a beach landing in Europe. Twenty years ago it would not have been suitable for housing or for agriculture, and would have remained a series of hills dotted with trees on either side of a ravine. It is bisected by a ravine (canyon in American parlance which gets more picturesque as you go west) about 90 ft. deep and about 300 ft. across at some points. On either side the land rises sharply and falls away again. This gives every house a view of the harbour, and the staggering of the units further assists this.

Roads are of two kinds; a continuous intercommunication road which generally follows the contours; and culs-de-sac which serve the housing. All the houses are planned on this principle, and access to them is not given from the continuous road. This system reduces road costs and the amount of graded, heavy-duty surface is reduced to a minimum. All the houses are further connected by a system of pedestrian paths which link up the whole estate quite independently of the road system. Where the paths meet the continuous road, tunnels are provided. Traffic is thus divided into three distinct classes. The system of the paths crossing the ravine should be noticed particularly; these follow the contours closely and give access to all the houses by acting as an outer ring to the cul-de-sac.

It might be thought that the ravine would divide the settlement into two separate sections, but Neutra has arranged the plan so that the continuous road crossed the ravine right at the centre of gravity of the layout. The road just goes plumb across the ravine and is sharply excavated on either side. This dramatic connection is only possible when mechanical means of soil movement are available.

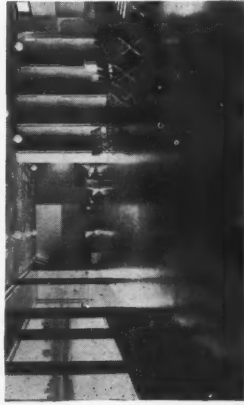
There is another connection between the two sides at the top of the ravine, and a view from there down to the lower road at the foot. The only criticism of this arrangement is that very young children must find the paths across the ravine tiring on their way to the nursery school. The community centre and the nursery school are combined in a single building, 47, and related to the community by road and path. The connection of the two roads crossing the ravine and their joint communication with the centre has been subtly arranged. The store is placed on the extreme west of the site, and here again it is rather curious that it should be so far from the dwellings to the east.

Lack of space makes it impossible to show the plan of the centre; the photographs, 44 and 45, will give some idea of the building. The nursery is arranged as a self-contained unit, 47, with access from the entrance hall of the centre. A good feature is the separation of the playroom by means of a glazed partition where the nurse in charge can sit immune from the noise. The ceiling is of wood wool unplastered, which also reduces the sound transmission.

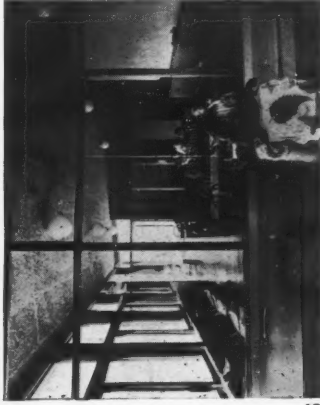
The main feature of the centre is naturally the assembly hall or auditorium. This can be divided into two sections by means of a folding screen about one-third of the way along. The smaller area with its fireplace makes a comfortable club room or the whole space can be thrown into one for dances. Evidences of shortages of critical materials, the absence of plastering to the



43



44



45



## COATESVILLE

Carver Court, Coatesville, is a much smaller scheme than Channel Heights, giving accommodation for only 100 families. It is situated in Pennsylvania, and the architects are George Howe, Oscar Stonorov and Louis J. Kahn.

It is in fact rather in the nature of a super-block with its own nursery school and community centre. It is set in gentle farm land, lightly wooded all round, and the contours dip to form a bowl round which the road runs. The care taken in preserving these natural features is admirable (plan on page 48).

The housing units, whose disposition is clearly shown in the site plan, are based upon the number of bedrooms. Units of one, two and three bedrooms are provided; here again the majority is of the two-bedroom type. Many American parents in these areas must be childless or nearly so. Each of these plan types dictates the form of the building. The one- and two-bedroom types are single storey; both terraces and semi-detached bungalows are used (page 48). The three-bedroom house is two storeys and has more storage as well as a car port, so there is some encouragement, delicately given, for the parents to go on. We might try the same award—a garage for the two- and three-child house in our own schemes.

The planning of the houses in this example is very deliberate. Although the rooms themselves are small by English standards (two-bedroom type: living room approximately 160 ft. super, bedrooms 124 and 100), the storage accommodation and equipment with heater room and fuel store is excellent.

The domestic scale of this project and the way in which single and two-storey housing is combined is shown in 1 and 55. The exterior of the houses and of the community centre is in horizontal bevelled siding in narrow widths; in some of the blocks this is painted white, and in others it is left in its natural state. Presumably the tenants do not sign repairing leases. The ground floor in the two-storey blocks and the end bearing wall in the community centre are of brick. The detailing of the whole scheme is sharp and simple, and shows some ingenious ideas like the window sill, 57, where circular apertures are made for flower pots. The trellises are another feature of American housing which might be used here more than it is. The collection of household rubbish bins outside the back door is unsightly and insanitary. But until our methods of refuse collection are improved the least that can be done is to hide it.

## CHERRY POINT

The architects (R. J. Rowland and Edward D. Stone, Allen J. Maxwell, associate) of this scheme in North Carolina have done a grand job in every direction except siting. The development of the site, see plan on page 49, is dull; but the buildings have a horizontal emphasis, and by keeping a fringe of pines between buildings and road a crude or raw appearance is avoided.

The plans of all the buildings are worth studying. The community centre (page 49) is of particular interest in view of the small size of the unit it serves. (There are only 270 dwellings in the whole scheme.) The centre is divided into two wings; in one, space is provided for manual activities and in the other social activities are catered for. A small kitchen is separated from the social room by folding screens. Beyond it is the usual children's nursery, confined this time to a single room. The appearance of the centre, 54, is informal and harmonises with the general character of the housing, 53. This itself is one of the most satisfactory features of the scheme. The houses vary in type from one to four bedrooms and the latter are two-storey buildings which are used to accentuate the roads, 53. In size these houses are spacious; they are also well equipped. In setting their top limits for subsidy the Federal authorities seem to have been more liberal than is the case over here. The living room in the one bedroom bungalow is 16 ft. 6 in. by 11 ft. 10 in., which is really large, and the bedroom is 130 ft. super, and, as usual, the storage is ample.

These bungalows, like the two-bedroom ones, are semi-detached, and their appearance, with the deep, overhanging eaves and sun porch, very satisfactory. Double hung sashes are used, 53. The two-bedroom type includes a dining alcove which has the second external door in it. This may interfere with its convenience.

A feature of these houses is that all the living rooms face away from the road and look over the communal garden which forms the centre of each island. Consequently the kitchen faces the road, 51. The architects have overcome the squalidity, usually inseparable from such an arrangement, by screening of the back door by means of a trellis which hides the clothes drying area as well.

The houses are wood frame or cinder block construction, and the weather boarding of redwood. The soffits, deeply overhanging, are painted, which seems an economical method of providing, in one operation, better lighting for the interiors, colour and emphasis to the building and low maintenance cost.

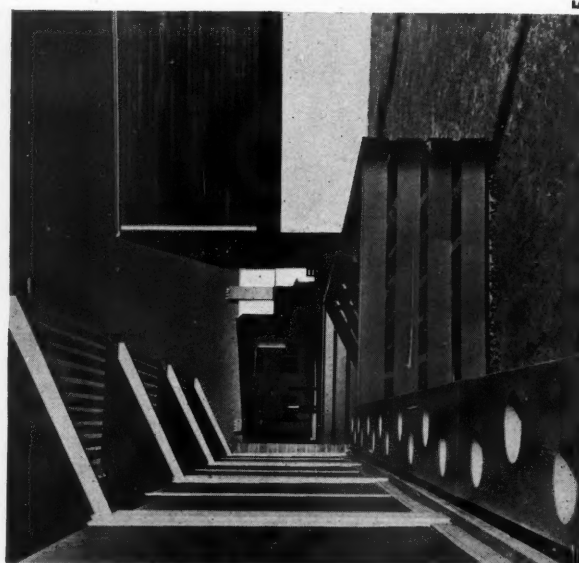
In the general layout the curving roads call for an explanation. They have probably been adopted to contrast the estate with the grid-iron cross road already in existence, and yet to keep as many of the housing units as close to them as possible. But it is rather an obvious arrangement and, with the vegetation, rather like the backwoods of Bournemouth.



55



56

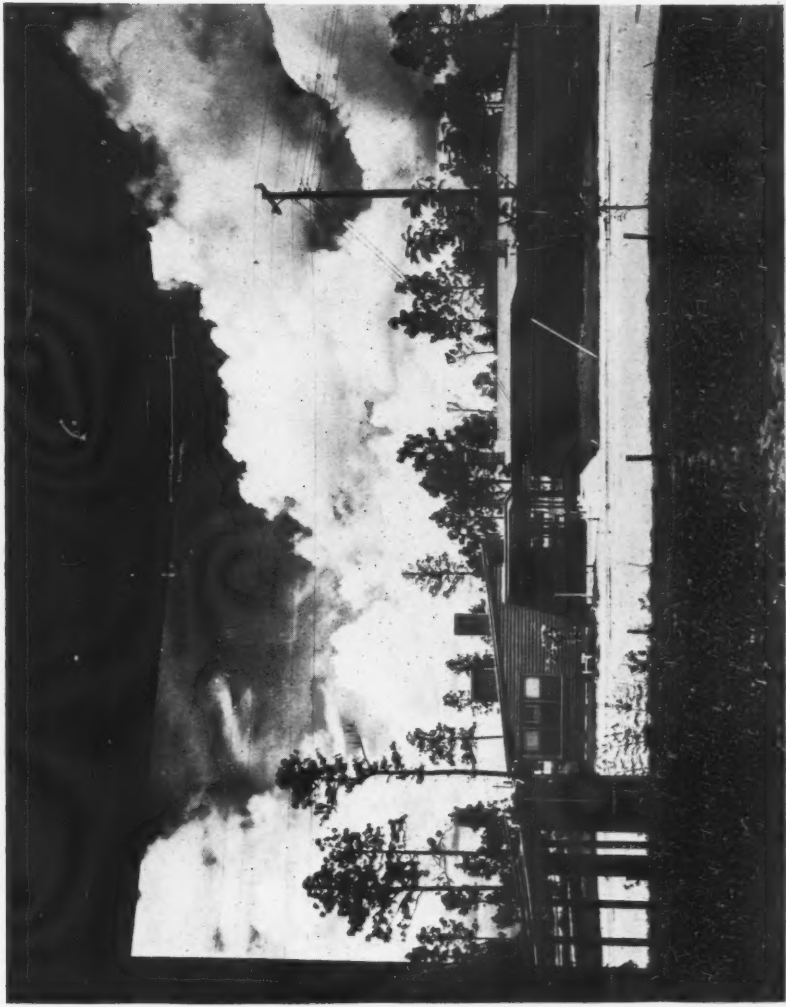


57





51, 52



53, 54

## MARIN CITY

Marin City is another of the schemes built to house shipyard workers. The architects are Carl F. Gromme, with F. E. Lloyd and H. P. Clark as associates. It is as dramatic a site as that at Channel Heights. Precipitous slopes tumbling down to the bay and a little bit of flat land at the bottom largely formed from an earth fill which was pushed from the hillside. It is also a very big scheme; there are 1,500 family units and a population of 6,000. All the houses are temporary; the larger cross hatched units in the two blocks in the centre of the site plan (facing page) are similar in character to those up on the hillside. Owing to the steep contours all the hillside houses in Marin City have been set on concrete piers to eliminate the necessity of excavation and levelling. The piers have been filled with boarding, and it is this feature, more than any other, which makes Marin City look like a mining camp.

Marin City is near San Francisco, and the state highway from that city passes along the waterfront. The city is kept back from the highway, and the local roads are laid at a lower level than the highway, so that they pass underneath it. Access to the state highway is by a half cloverleaf junction which has been cleverly adapted to the site.

The size of the project demands an exact allocation of land among the various activities, for which provision has to be made. Most of the communal buildings have been placed in the small triangular area which is bounded by the hills on two sides, and by the state highway on the third. Recreation space is provided down behind the highway for both adults and youths and immediately behind the former is the shopping centre of the town. This includes shops, a big covered market or department store and a large cafeteria, all connected up by arcades, and also a clinic and an infirmary. Higher up the hill and in the apex of the triangle lie the school and the community buildings, 57 and 58.

The siting problems are extremely well handled, and it is clear that a good working arrangement is provided by the disposition. If the appearance of the housing, which is ingenious in plan, and the planting were equal to the plan itself, it would be an attractive community.

The school is naturally on a much larger scale than those normally built for such defence schemes (page 48). The classrooms are projecting wings running due east and west and the main windows are to the north—a necessary provision in this hot climate. There are twelve classrooms in all, each approximately 40 ft. by 25 ft. They are approached by an open loggia, 57. By our standards these projecting classroom blocks are too close together; again the difference is climatic as the intensity of the light is sufficient to give adequate natural lighting so that the spacing is based on the sound factor. Along the main corridor of the school are the teachers' rooms and offices. It will be noticed that there is no assembly hall or gymnasium and the community centre which adjoins the school is used for this purpose. This fusion of the two is more common in the U.S. than over here. The section through the school classroom is interesting in view of the attention now being paid to them in this country. The one-way pitch sloping up to the clerestory allows a greater measure of light through this window. The heating duct passes along the centre of the classroom ceiling.

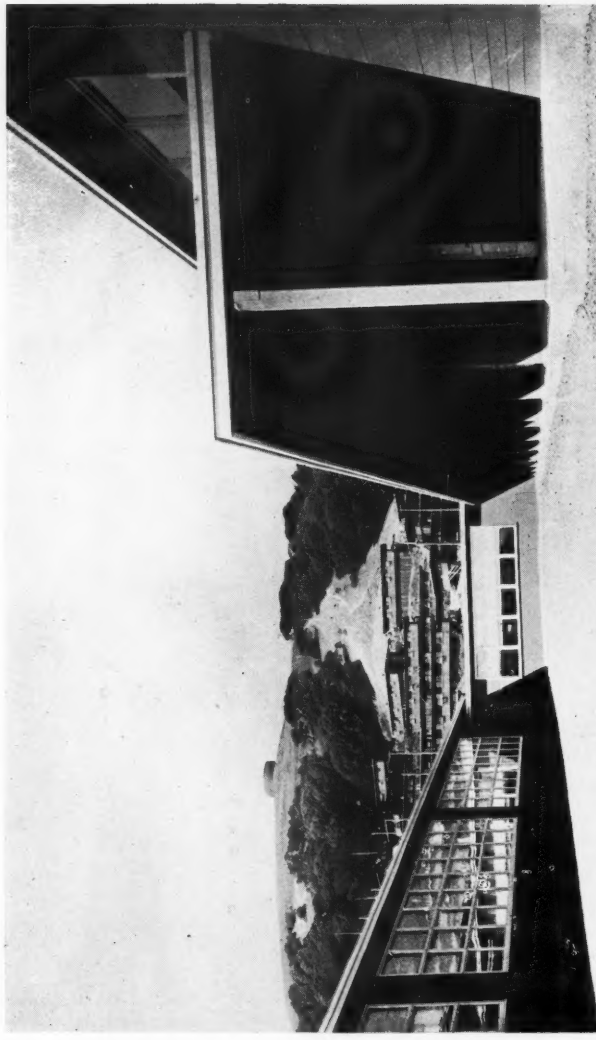
The children's nursery is attached to the community centre, 55, and lies across the road from the school. All these buildings are constructed, like the houses, of timber frames and faced with horizontal weather boarding. Plans and sections of the houses are reproduced (page 47). The types of plan are standardised. It should not be forgotten that this scheme is for temporary occupation. The one-bedroom type illustrated is remarkably simple. The bathroom and kitchen are placed centrally between bedroom and living room, thus centralising and simplifying service connections. They are ventilated and lit by a

they follow the contours of the site is given, 57.

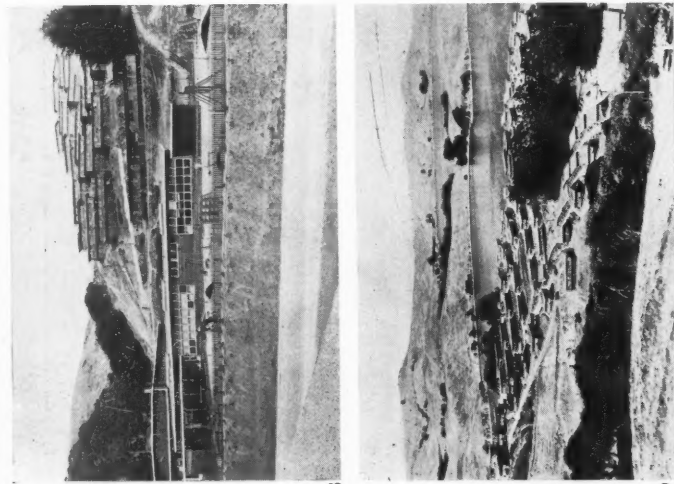
Throughout present-day American practice one is struck with the mastery of timber technique. This revival of interest in the possibilities of timber is of comparatively recent origin and the structural applications and developments (the ring connector for instance) appear to be keeping pace with developments in plywood and other semi-synthetic applications. These applications meet in the field of prefabricated building, and there the parallel development which has taken place can best be studied.

But the design of these war-time buildings, and those illustrated on page 51, will repay careful study. Timber is by no means the only material available, although it is the most commonly used. Brick, for instance, has been combined with timber in the example from *Avion Village*, Grand Prairie, Texas (R. J. Neutra, architect, with D. Williams and Roscoe DeWitt), where the latter is used as a vertical accentuation in panels, 62. In *Pennypack Woods*, Philadelphia (George Howe, Oscar Stonorov and Louis Kahn, architects), 65, timber, in narrow widths, which we know as weather boarding, has been used for two-storey houses. At *Center Line*, Michigan (Eliel and Eero Saarinen, architects), 63, both horizontal and vertical boarding is used, the latter with clapping of varying widths with a cover strip. This gives a wall of great quality and scale. For the housing scheme at *Calvert*, Washington, D.C. (Studmore, Owings and Merrill, architects), 63, a prefabricated panel unit is employed, and the joints emphasized by strips. From *Appalachia*, North Carolina (Roland A. Wank, architect), 66, comes yet another variation of the timber technique. The design of the windows and the trellis is very satisfactory. Timber is used to screen the clothes drying area at *Taft*, California (Vernon DeMars, architect), 69, and as a contrast to the rendering on the first floor. In the shopping centre at *McLaughlin Heights*, Vancouver (Roi L. Martin, architect), timber appears throughout both for the frame, 64, and the external facing.

The bungalows at *Windsor Locks* (Hugh Stubbings, jun., architect), 66, part of a military scheme, are very simple and direct in their design, and rely entirely on the texture of the timber and the rhythm of the windows for their effect. Walter Gropius and Marcel Breuer's housing at *New Kensington*, 70, a very interesting scheme, also shows an almost aerial use of timber. These few buildings give some idea of the range of materials used. *Windsor Locks* and *New Kensington* will be published in THE ARCHITECTURAL REVIEW separately.



60



58

59



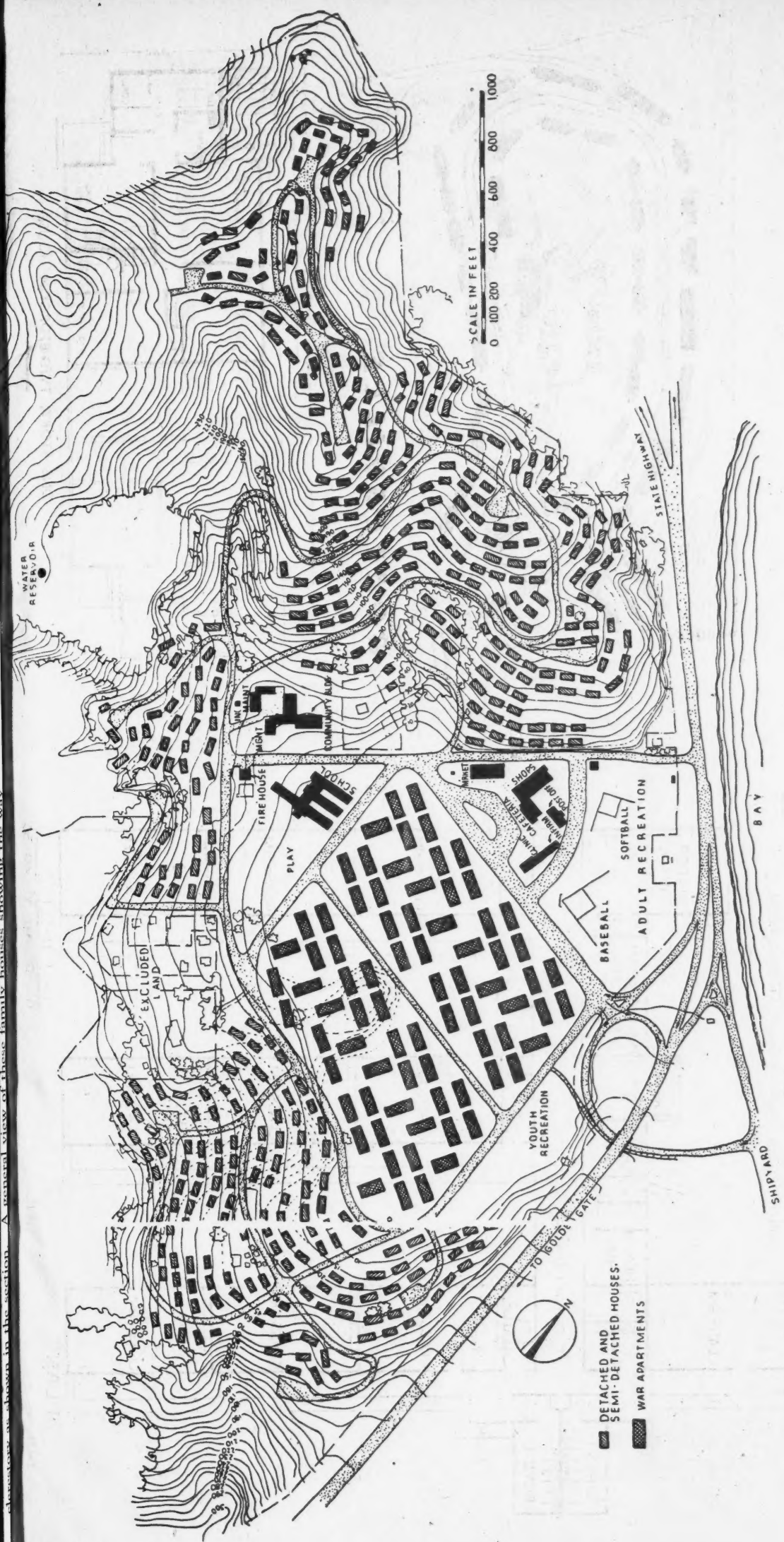
simple. The bathroom and kitchen are placed centrally between bedroom and living room, thus centralising and simplifying service connections. They are ventilated and lit by a central duct system, as shown in the section. A general view of these family houses showing the way

...are to be seen in the section. A central view of these family houses, showing the way

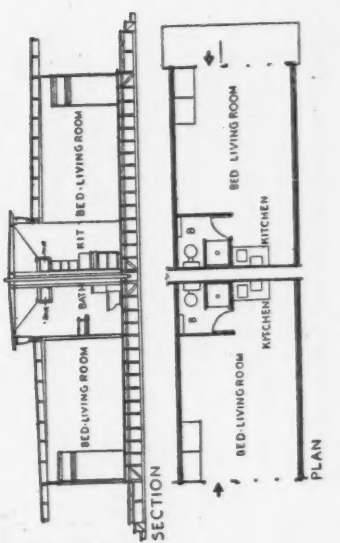
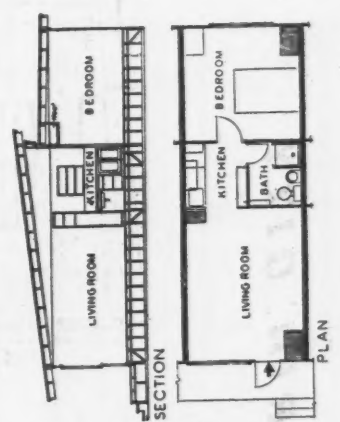
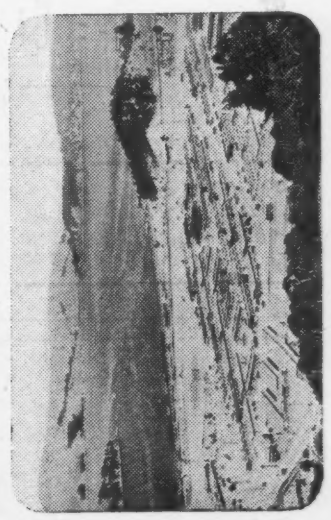




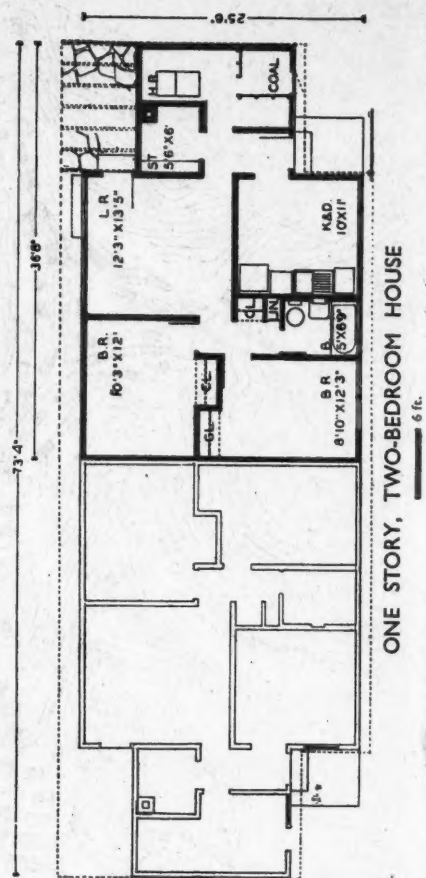
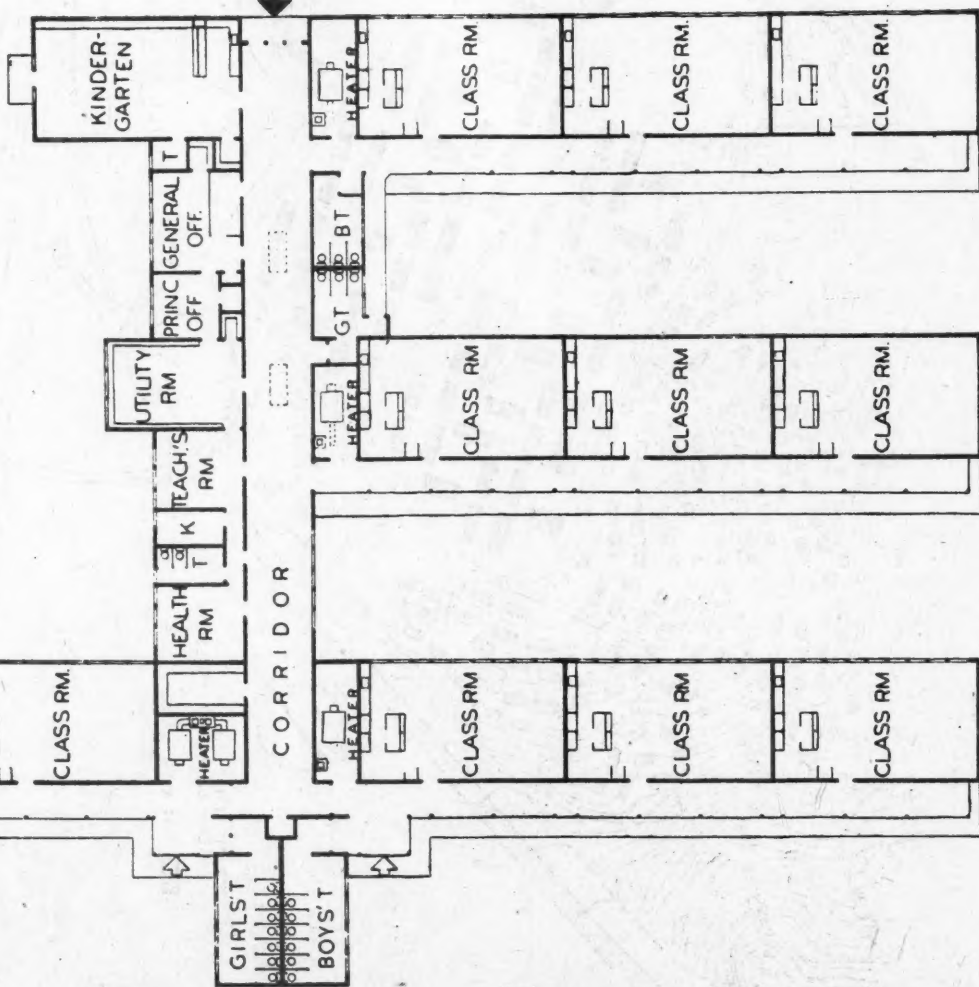
directions as shown in the section. A general view of these family houses is shown in the view.



# MARIN CITY

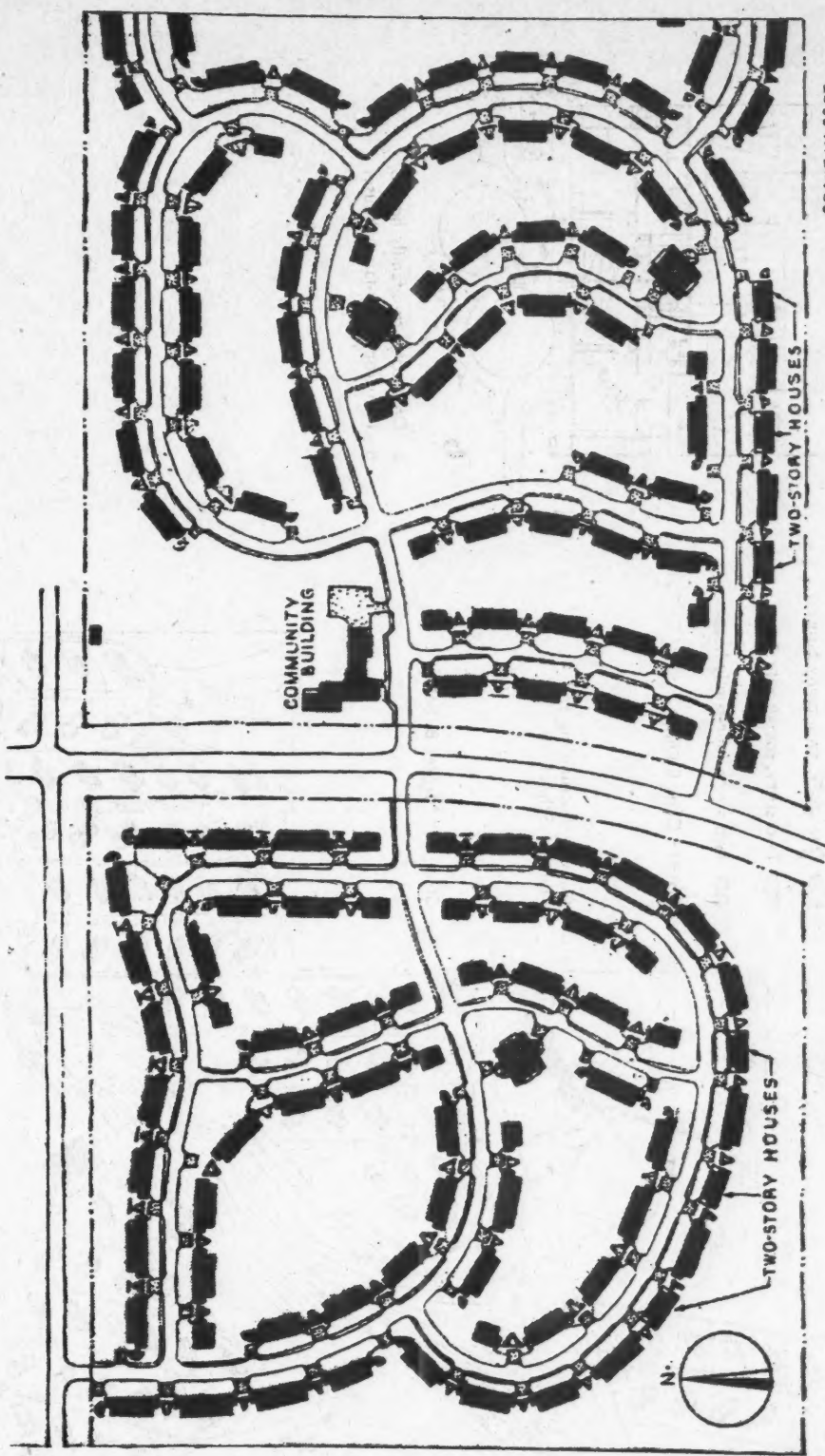


Floor plan of the first floor of the school building. The plan shows a central corridor (CORR) with two entrances. To the left of the corridor are three classrooms (CLASS RM) and a heater. To the right are three classrooms (CLASS RM) and a heater. At the bottom of the corridor are the girls' and boys' restrooms (GIRL'S T and BOY'S T). The plan is labeled 'PLAN' on the right side.

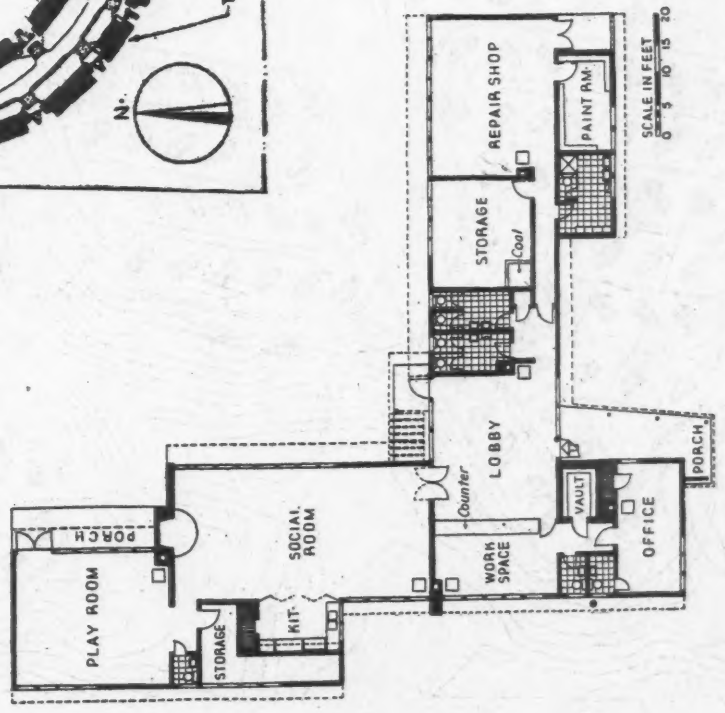




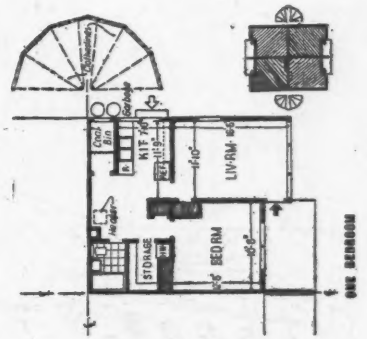
CHERRY POINT



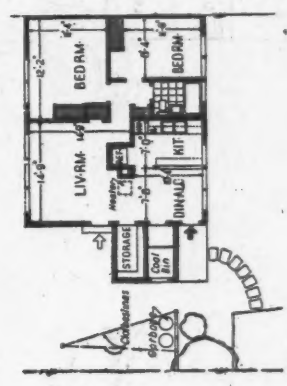
SCALE IN FEET  
0 100 200



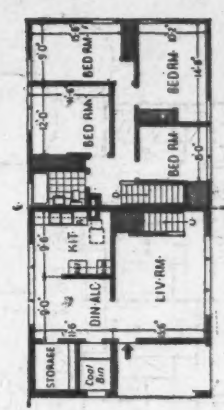
SCALE IN FEET  
0 5 10 15 20



ONE BEDROOM

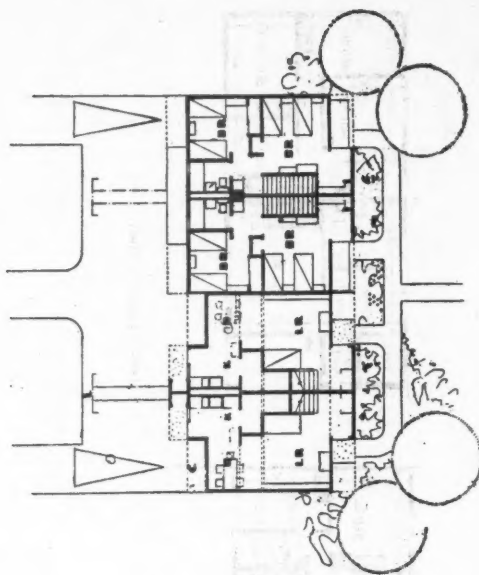
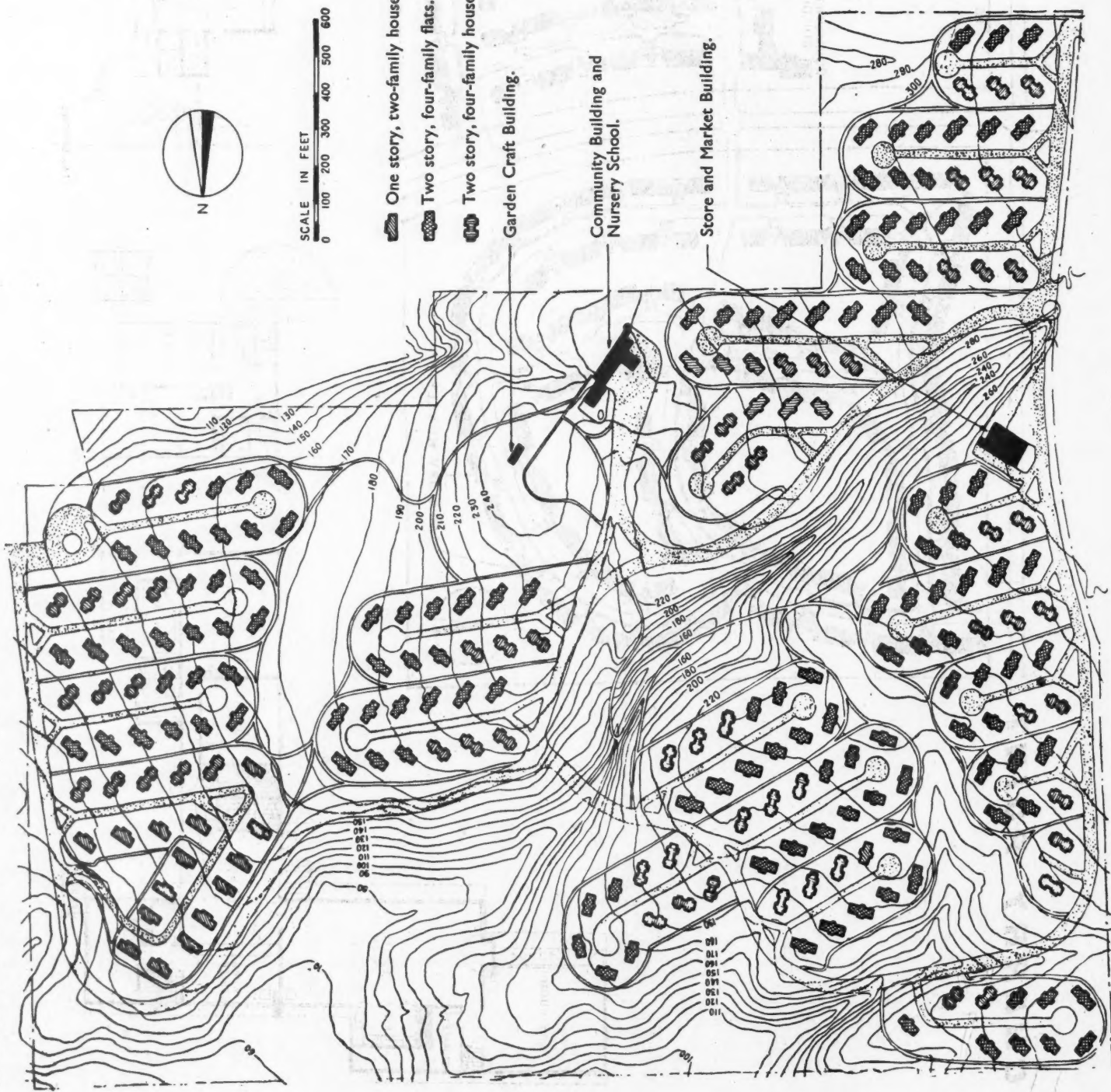


TWO BEDROOMS

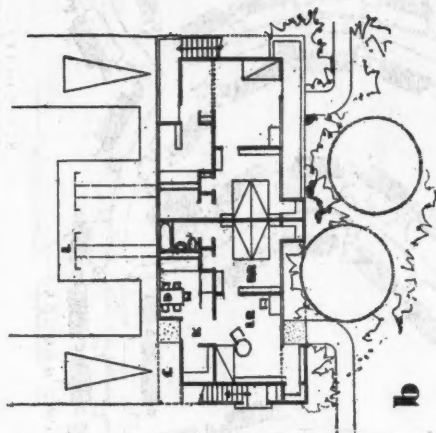


FOUR BEDROOMS (2 STORY)

# CHANNEL HEIGHTS



a



b

- a One story, two-family house.
- b Two story, four-family house.





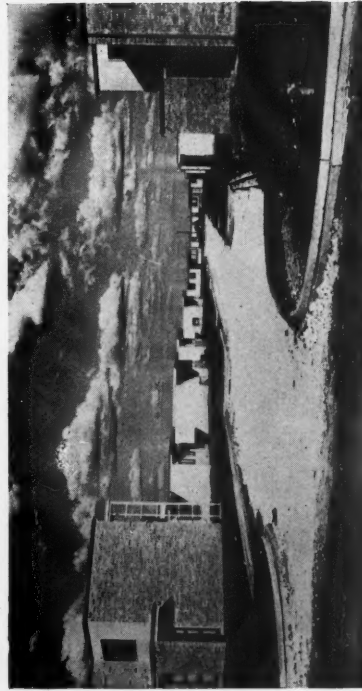
62 Avon Village, Tennessee  
63 Calvert Homes, Washington, D.C.  
64 McLaughlin Heights, Vancouver, B.C.

65 Pennypack Woods, Pennsylvania  
66 Appalachia, North Carolina  
67 Windsor Locks, Connecticut

68 Centerline, Michigan  
69 Tait, California  
70 New Kensington, Pennsylvania



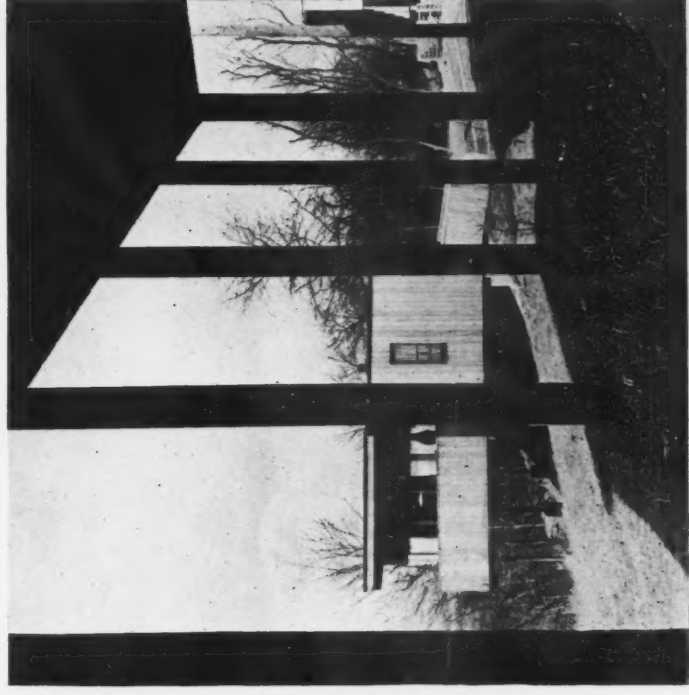
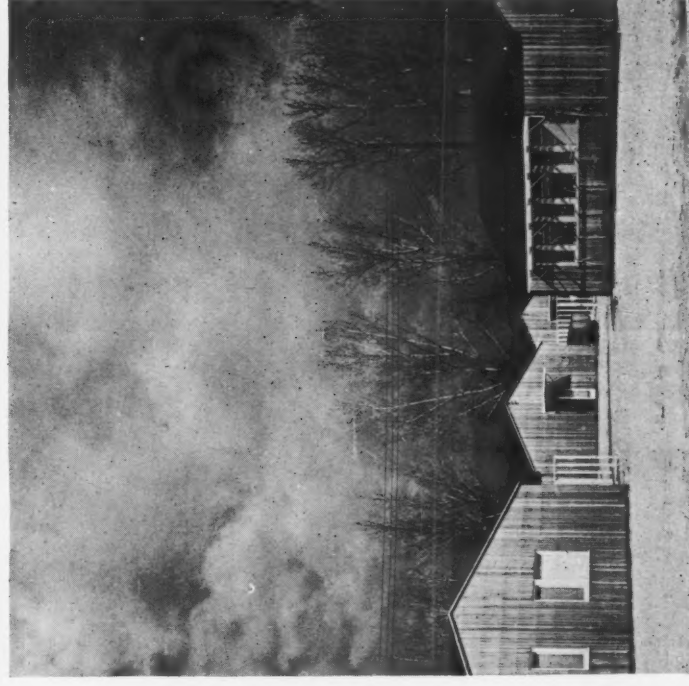
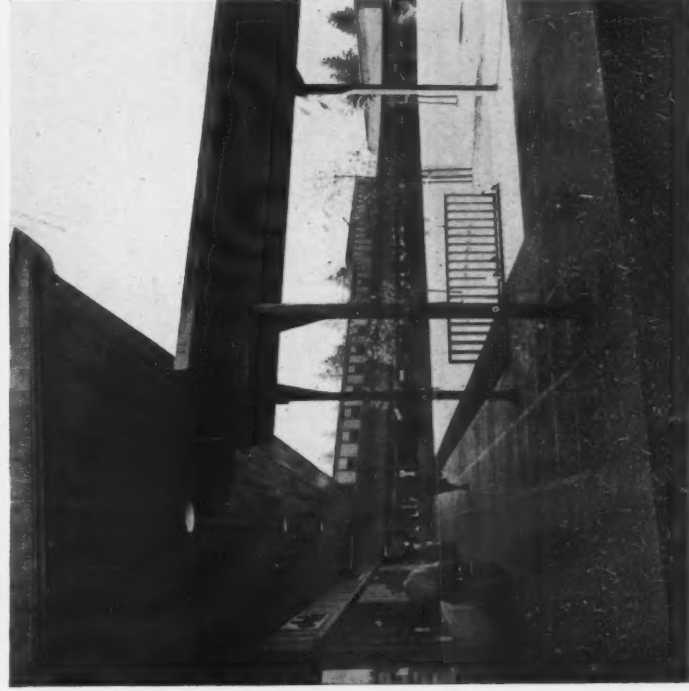
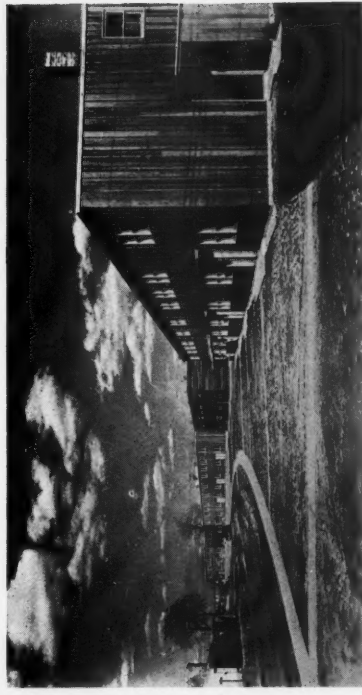
62 Avion Village, Tennessee  
 63 Calvert Homes, Washington, D.C.  
 64 McLaughlin Heights, Vancouver, B.C.



65 Pennypack Woods, Pennsylvania  
 66 Appalachia, North Carolina  
 67 Windsor Locks, Connecticut



68 Centerline, Michigan  
 69 Taft, California  
 70 New Kensington, Pennsylvania



# MATERIALS AND TECHNIQUE

The U.S. is a long way ahead of us in their application of power tools and job organisation. Doubtless the building industry in this country is absorbing the M.O.W. report *Methods of Building in the U.S.A.* (H.M.S.O., 1944, 4d.). Some of the statements contained in this excellent report are so arresting and summarise the American methods of building so well that we cannot do better than quote them.

The skilled craftsman in the U.S.A. receives a far higher hourly rate of pay than the British; the difference between the craftsman's pay and the labourer's is also more marked than it is in this country. But by keeping steadily in mind the fact that skilled labour is an expensive item, the industry has succeeded in avoiding the high building costs which might have resulted from wage rates of this order.

From the general plan down to the smallest detail, great attention is paid to simplification of workmanship.

Buildings are designed for the maximum of mechanisation in constructional work. There is a tendency to restrict wet processes requiring time for drying, including brickwork and plastering, and to design for larger building units, such as window spandrels of light alloy, hollow masonry units of clay or concrete for backing in walls, and large building boards and sheets.

Generally, greater use is made of factory produced parts, as, for example, steel window lintels and metal door frames complete with finished trim.

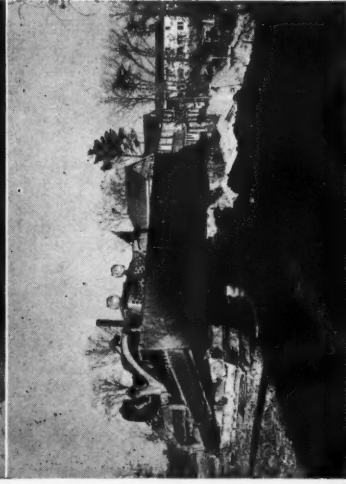
There is a high degree of job standardisation.

Buildings are designed so that electrical and mechanical installations may proceed with the construction. The setting out and forming of openings, ducts and chases is minimised by designing for the fixing of pipes, etc., in advance of wall construction. Staircases are erected with the structural frames.

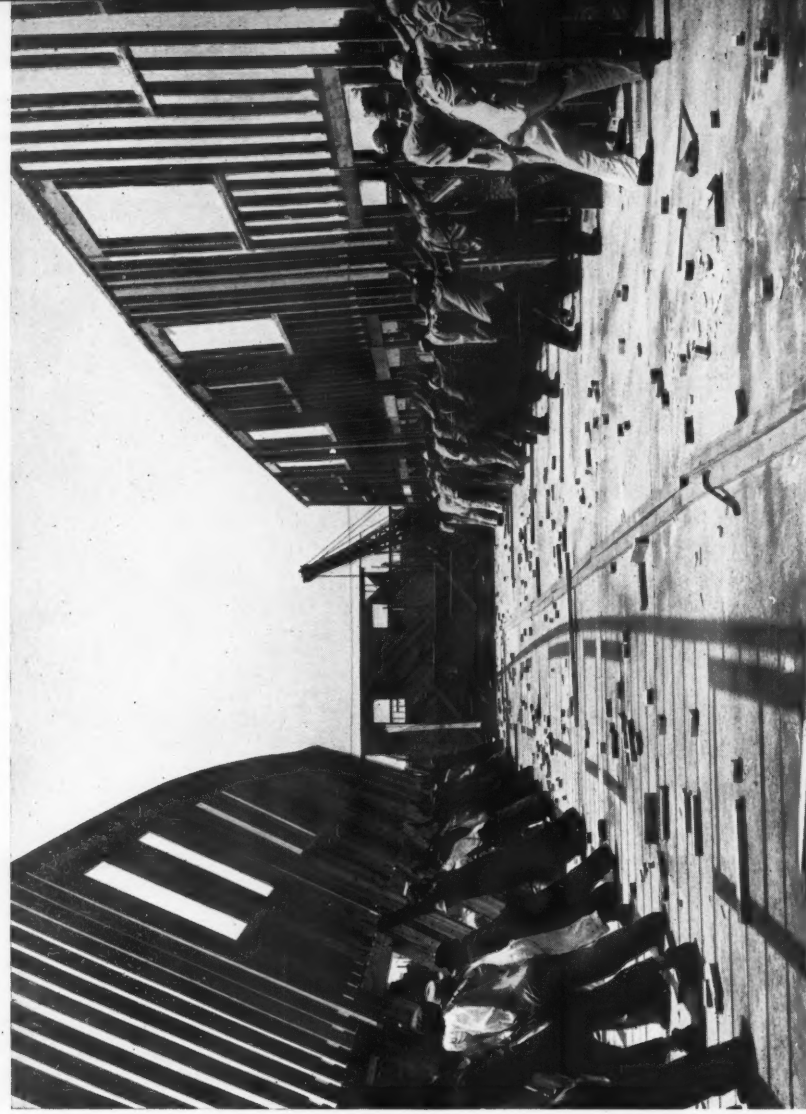
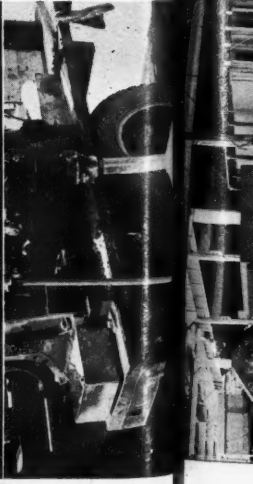
Unfortunately, the examples available for this number mostly rely either on a technique of timber construction, whether in frame or panels, or the application of building boards. Our special problems are somewhat different; timber is likely to remain in short supply, but steel and asbestos will be more plentiful. The methods of factory fabrication and the tools used are naturally different for these materials than for the methods of construction illustrated. At the same time the assembly of materials on the site, the job organisation, is very similar, even though the type of unit and its size may vary.



71



72



76



## JOB ORGANISATION

In the report just referred to, mention was made of the methods used to reduce handwork on the site to a minimum and to mechanise the craftsman. To achieve this every large building job is standardised down to the last detail so that as much of the work of cutting and fitting can be carried out in the factory where accurate jigs are made. This means that the whole sequence of building operations is split up, not only in regard to structure but also in site work, and in the installation of equipment. Having split the processes each must be studied to see how it can be rationalised and the labour gangs trained—or re-trained—accordingly. Having determined the extent of the job which can be more economically and rapidly handled in the factory, the next stage is to decide upon the size of such a unit. Ease of site handling, the plant available, ease of transport and the distance of the job from the point of manufacture must all be taken into account. Then the materials—the constructional units—and the components, like doors and windows, the equipment like heating and plumbing assemblies, have to be assembled in the quickest possible time.

This is one of the principal fields where the rationalisation of building methods has effected the greatest saving in time. In a normal brick-built house the units—bricks and timber—are laboriously handled, cut to lengths and fixed. In the process there is much wastage of man power, since efficient machinery is seldom available and, so far as bricks and mortar and plaster are concerned, it is all cemented together by tons of water. Then, of course, the water has to dry out again before it can be inhabited.

From the exhibition some small idea can be got of this process of mechanisation. Site work: the laborious business of scratching up the top surface of the soil and digging the foundation trenches and then of shoring them up so that they cannot fall in while the work of concreting goes slowly forward, is eliminated. A machine can dig the trenches, cut foundations for piers and posts and remove the top soil, 71, 73. The bulldozer, 72, can remove hills, grade roads, even remove bomb damage as we saw in Italy. Another machine follows behind laying pre-mixed concrete, with rapid hardness—or in cold winters pre-heating the concrete before laying. So the foundations are completed.

In the sequence of illustrations. A building board production line, 74, is the beginning of such a process and applies to most systems. With the use of power-driven tools, even if the units are not entirely accurate, they can be cut quickly and easily on



concrete, with rapid hardness—or in cold winters pre-heating the concrete before laying. So the foundations are completed.

In the sequence of illustrations. A building board production line, 74, is the beginning of such a process and applies to most systems. With the use of power-driven tools, even if the units are not entirely accurate, they can be cut quickly and easily on the site where the furry arms, 71, control a machine whose speed can be measured in feet per minute. And this applies to both timber and steel. Unfortunately, in this country, the electric power supply often arrives late in the process of erection. The size of the units themselves has an important bearing on the methods of erection. Originally it was thought that the larger a structural unit the more rapid would be the erection, since fewer joints would be required. In this direction greater experience has modified the original view; big units are more exposed to damage in transit or in erection and the loss is greater than in the case of a small one. In any case the units themselves being to rely on the bolted joint, is also apparent. The tendency to use clips, expanding wedges, sprung fixing, rather than the complete kitchen or bathroom unit is one of the favourite talking points of the prefabricator they are not much in evidence in the exhibition. Indeed, the transit of heavy equipment and the risk of damage during site handling has led many firms to revert to the individual item, whether sink or cooker, for connection to the service assembly. The site equipment is, of course, important. The use of travelling cranes and gantries which can handle large units without distortion, is an important factor in determining the size of a component.

The contrast between erection by man power, 76, and by machinery, 79, is instructive. Generally the sequence of erection does not greatly vary on the site. The determining factor is whether the building is framed or not. If framed, this is naturally erected first, although the extent to which the panels stiffen the structure must have an effect upon the sequence. If, on the other hand, the panels themselves form the structure, then the building seems to go up ready made as it were. Floor decks and roof go on at the earliest possible stage so as to protect the interior of the building during the fixing of linings and equipment. Of course in America the conditions for rapid site assembly are more favourable than in this country when the broken weather is more likely to interfere with progress. It may even be the experience of Americans over here.

## PREFABRICATION: STANDARD FRAME CONSTRUCTION



75

The oldest method of timber framing is what we now call the platform frame. In this method each storey height is separately framed; if it is a single storey building the effective length of the upright member is the height from floor fixing to roof fixing. Roof, floor and walls form independent units.

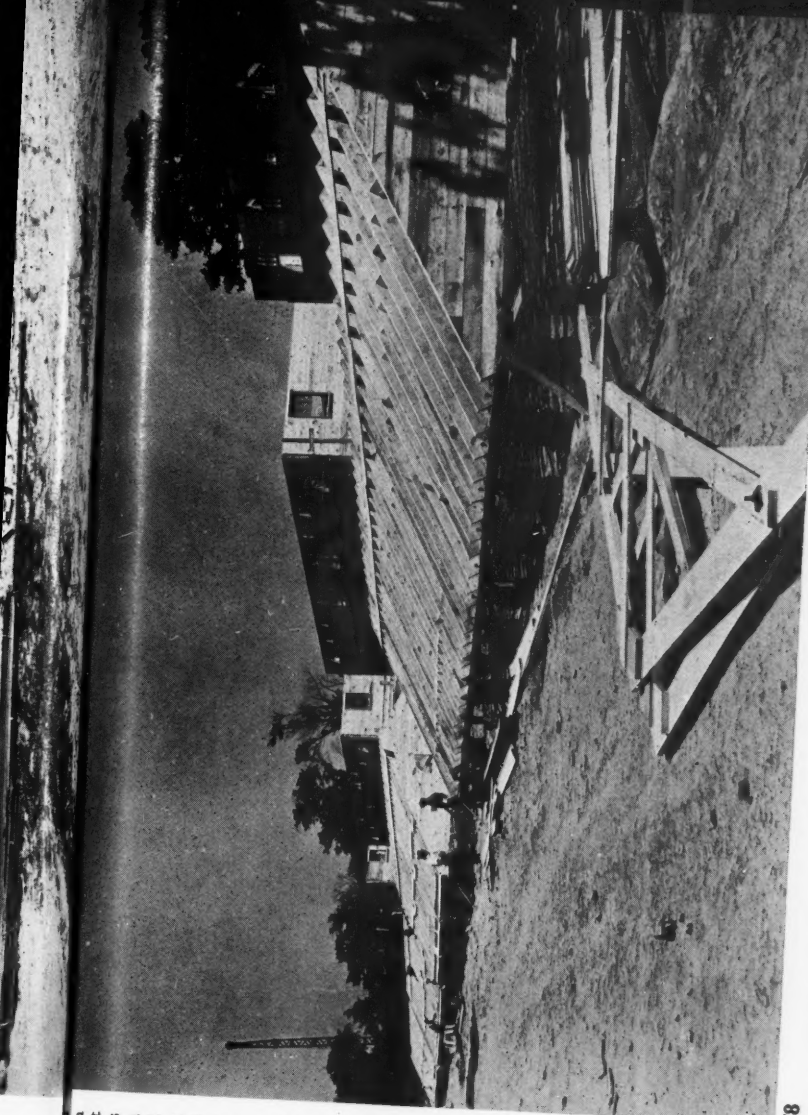
Naturally this system is the one most commonly used in prefabricated building; even when the wall becomes a series of panel assemblies it can still be thought of in this way. Because of their ease of erection and the simplicity of the connections, most of the schemes illustrated in the exhibition when they are timber framed belong to this type. It is easily erected manually or by machinery, and variations in size and distortions can be corrected without difficulty, 75. Floors and roof trusses and covering materials are erected separately, and this loosens up site organisation; trusses can be built in complete sections and lifted into place, 78 and 79. It can have the lining materials (internal and external) applied in the factory or on the job. It can be braced in any direction—horizontally, vertically, diagonally—to meet any kind of loads. The complete platform frame, 77, shows some of the directions in which it can be stiffened, and the ease with which it can be erected.

The much boosted balloon-frame, on the other hand, cannot be built on the platform principle. The whole of the structure acts together—it is the timber equivalent of monolithic concrete construction. The wall is stiffened by the floor, the floor by the wall and the roof stiffens and braces the whole structure. It is a more accurate and scientific use of timber than the platform system; it economises in material while giving certain constructional headaches.

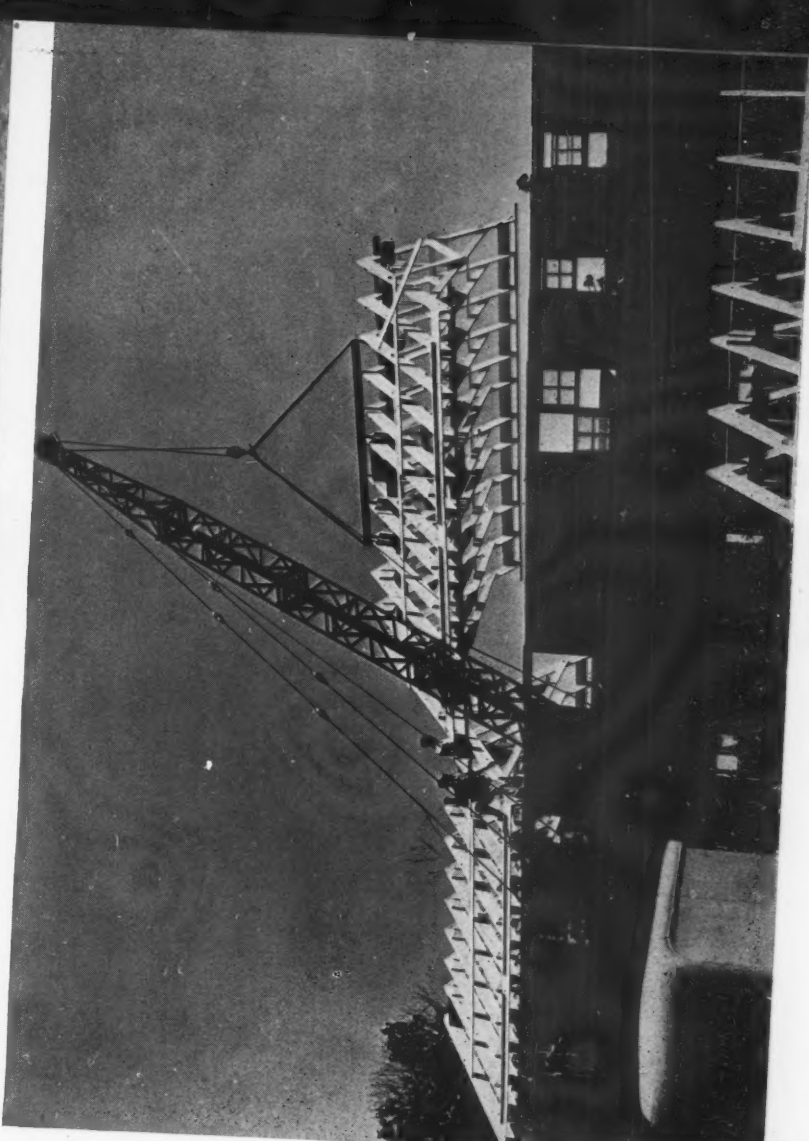
According to Giedion (*Space, Time and Architecture*) "If it had not been for the knowledge of the balloon-frame, Chicago and San Francisco could never have arisen, as they did, from little villages to great cities, in a single year." It is also possible, but this can also be done with the platform frame so that the reason for this claim is rather obscure. But these two statements make it clear why, in the Defence housing programme, the balloon-frame was so extensively used.

All the systems based on timber, except stressed skin constructions, apply one principle or the other to their problems. It is the basis of the illustrations which follow.

58



78



79



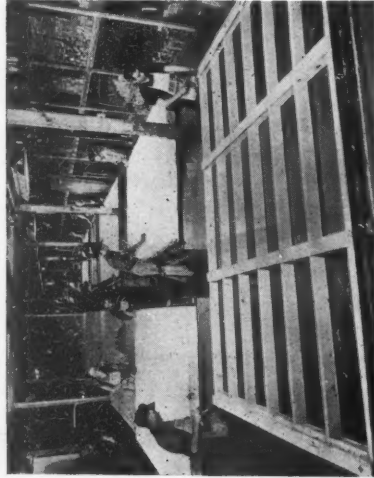
## FACTORY PRODUCTION

Both the framed systems of construction can be used for *in situ* or for factory methods of construction and assembly. Both methods have been used for greater flexibility on the same job as the standard timber for structural purposes is usually of a 4 in. by 2 in. section. It is here that the modular unit of construction, vociferously advocated in America and subsequently—*sotto voce*—in this country, becomes important. A modular ratio enables all fittings, equipment and components to be made on the same dimensional standard and ensures that they will fit together on the site. The first attempts at prefabrication in timber were obviously made on the site. It is quicker and cheaper to knock a frame together on the ground. The next may conceivably have arisen from efforts to mass produce flush doors. The continuous boards, the production of which was illustrated previously, <sup>74</sup> can be accurately stuck to the frame. With the modern synthetic glue, the strength of such a construction is so much increased that the stresses can be borne by this skin stiffened by ribs. This form of construction has proved to be of enormous importance and is generally known as stressed skin. Paint can be economically applied by spraying under controlled conditions, and thus eliminate the delays which result from site painting. It will be noticed that the panels now move on a continuous rail, <sup>81</sup>, so that one operation—priming, painting and drying—can succeed another.

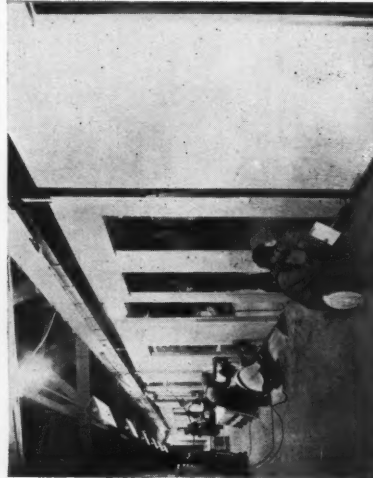
## ERECTION THE SITE

For both prefabricated and *in situ* construction, good site organisation is necessary. It seems likely that craftsmen will decline in numbers; that we shall no longer require, to the same extent as in the past, the skilled operative, working with his own tools, his own methods, at his own pace. The craftsman will be employed in the factory where modern tools will increase his output. The war has shown that skilled teams of erectors, each team trained in a single process of assembly and working on piece rates, can increase output. This process of rationalisation can be applied to traditional forms of construction, and in the United States there has been a good deal of experience in these methods.

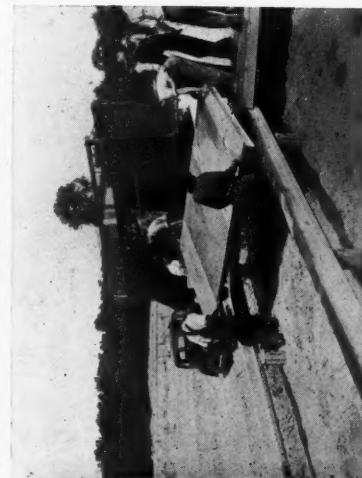
The piers are dropped into position and the floor deck is laid in large pre-cut sections and bolted down, <sup>82</sup>. As the finished floor surface is incorporated in the factory it is delivered with a paper protection. With standardised wall units, there is no need to set the building out in the customary way. A blue print gives the sequence for the panels, <sup>83</sup>. The ground floor platform in the background are ready for the erections. It will be



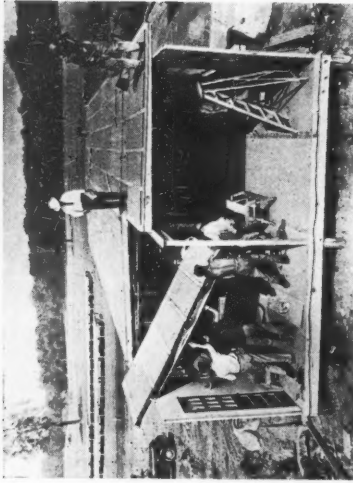
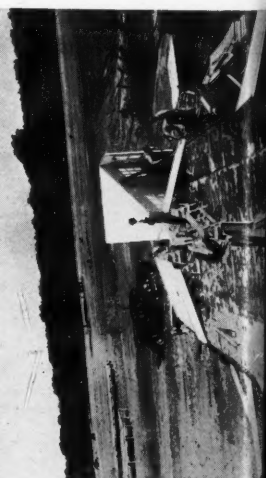
80



81



82



84

is naturally the determining factor, and there is generally a tendency to keep the units down to a size and weight which can be manhandled. The wall and ceiling units incorporate windows and doors, as well as thermal insulation, <sup>85</sup>, in this case slag wool. The impervious top-finish to the roof is usually applied afterwards. <sup>84</sup> shows the completed units.

85

## STRESSED SKIN CONSTRUCTION

The use of the inner and outer covering to stiffen a frame is not new. Diagonal boarding has this effect; but the tremendous possibilities inherent in this form of structure are only now being realised. This is because stressed skin construction—so far as its applications in building are concerned—relies very largely upon a continuous sheet facing and upon synthetic glues possessing enormous tensile strength. The two surfaces are glued to the core or frame, and the core acts rather like the web of a beam.

The core is usually of timber, but it can also be of laminated wood, reconstituted wood, or even some form of plastic. Wide variations in quality and performance are possible. Perhaps the simplest example of stressed skin is the ordinary flush door, where two sheets of plywood are glued to a timber frame.

The frame itself can be laminated with a reduction in size. By using metal interlays in the lamination the strength can be greatly increased; another method is to shrink the sheets on to the frame so that they are already pre-stressed before they are loaded, and thus increasing their strength. Stressed skin principles are extensively used in the construction of aircraft, and it is likely that they will be increasingly applied to building construction. During the war, both here and in America, the scarcity of plywood and other factors have largely excluded the use of stressed skin construction in building.

The manufacturing of such panels is comparatively straightforward. Reduced to its simplest form it consists of a frame and two sheets of board, <sup>86</sup>. The surfaces to be glued are passed through a machine where they are thoroughly impregnated, <sup>87</sup>. The next stage is more variable and complicated; the unit is placed in large presses, and the glue impregnates the surfaces under pressure, <sup>88</sup>. The pressing process must be continued for some time according to the type of panel; at this stage, particularly in laminated boards or with a plastic core, the panel is subjected to heat, and can be shaped and curved. Different kinds of sheet can be used, and impervious external faces, like resin bonded plywood used with an interior sheet of building board or impregnated paper; the texture and appearance of such units is very effective, <sup>89</sup>. Thermal insulation can be incorporated and the panels, surprisingly light and thin, are easily assembled, <sup>90</sup>. The joints have cover strips glued to them. Window frames and weather strips are incorporated in the unit. There is still a good deal of doubt, in this country particularly, about the permanence of plywood when used externally; like every other material, safety lies in the quality. Good plywood with high quality glue, if

89

tested properly, still last a long time, and other quality glue, if



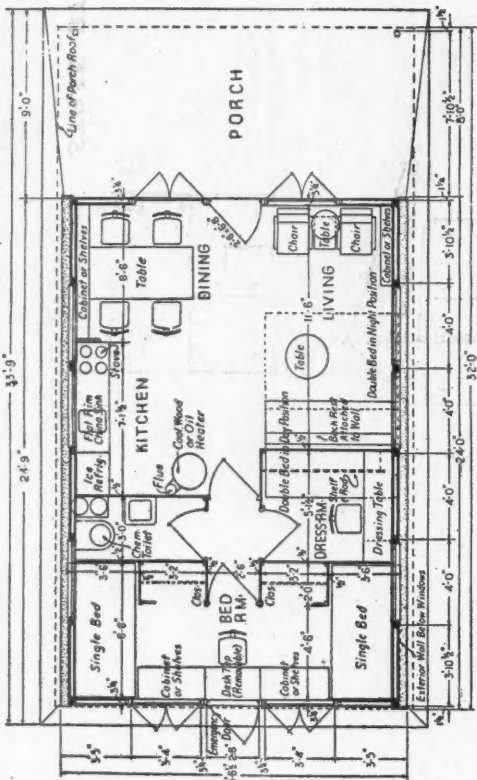
need to set the building out in the customary way. A blue print gives the sequence for the panels, 83. The ground floor plans forms in the background are ready for the erectors. It will be

of plywood when used externally; like every other material, safety lies in the quality. Good plywood with high quality glue, if treated properly, will last as long as any other form of timber. 90







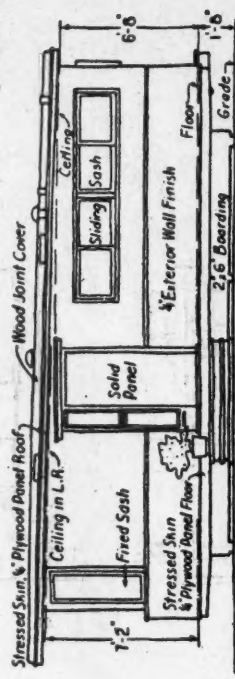


**FRAME AND NON-BEARING WALL**

Labels and Dimensions:

- 1"x3" Nailing Strip
- Hurricane Clip
- Outriggers
- 1"x4" Soffit
- 7 1/2"
- 1 1/2"
- 1-0 3/8"
- 1 1/2"
- 1 3/4" Celotex
- 3'-10 1/8"
- 4'-0 1/8"
- Cont. Sill
- 2'-1 1/8"
- 1" Floor
- 1-x8" Ribbon
- 2-x8" Joist
- Precast Conc.
- Termite Shield
- 12"x12"x8" Pier
- Wd. Strip
- 3'-6 1/8"
- 1'-0"

## UNIT JOINT AT FLOOR UNIT JOINT AT ROOF



A detailed floor plan of a small house, oriented horizontally. The overall dimensions are 25'-8" wide by 10'-4" deep. The layout includes:

- Front Porch:** 6'-5" wide, featuring a "Self Top" and a "Shelf".
- LIVE DIN RM:** 12'-2" wide, containing a "Table", "Seal", "Heater", and "Drawers Under". A "Roof Vent" is located on the right wall.
- KIT (Kitchen):** 10'-4" wide, equipped with a "Ref" (refrigerator), "Sink", "Stove", and "Range".
- BATH:** 17'-9" wide, containing a "Shower", toilet, and sink.
- BED RM:** 11'-22" wide, featuring a large bed and a "Clos" (closet).
- Bed Davenport:** 12'-2" wide, located on the left side.
- Additional Closets:** Two more "Clos" are located near the center of the plan.
- Dimensions:** Various smaller dimensions are marked throughout the plan, such as 11'-9", 12'-0", 15'-6", and 11'-22".

Floor plan of a building with four rooms, each measuring 6'-8 1/2" x 8'-6 1/2". The layout includes:

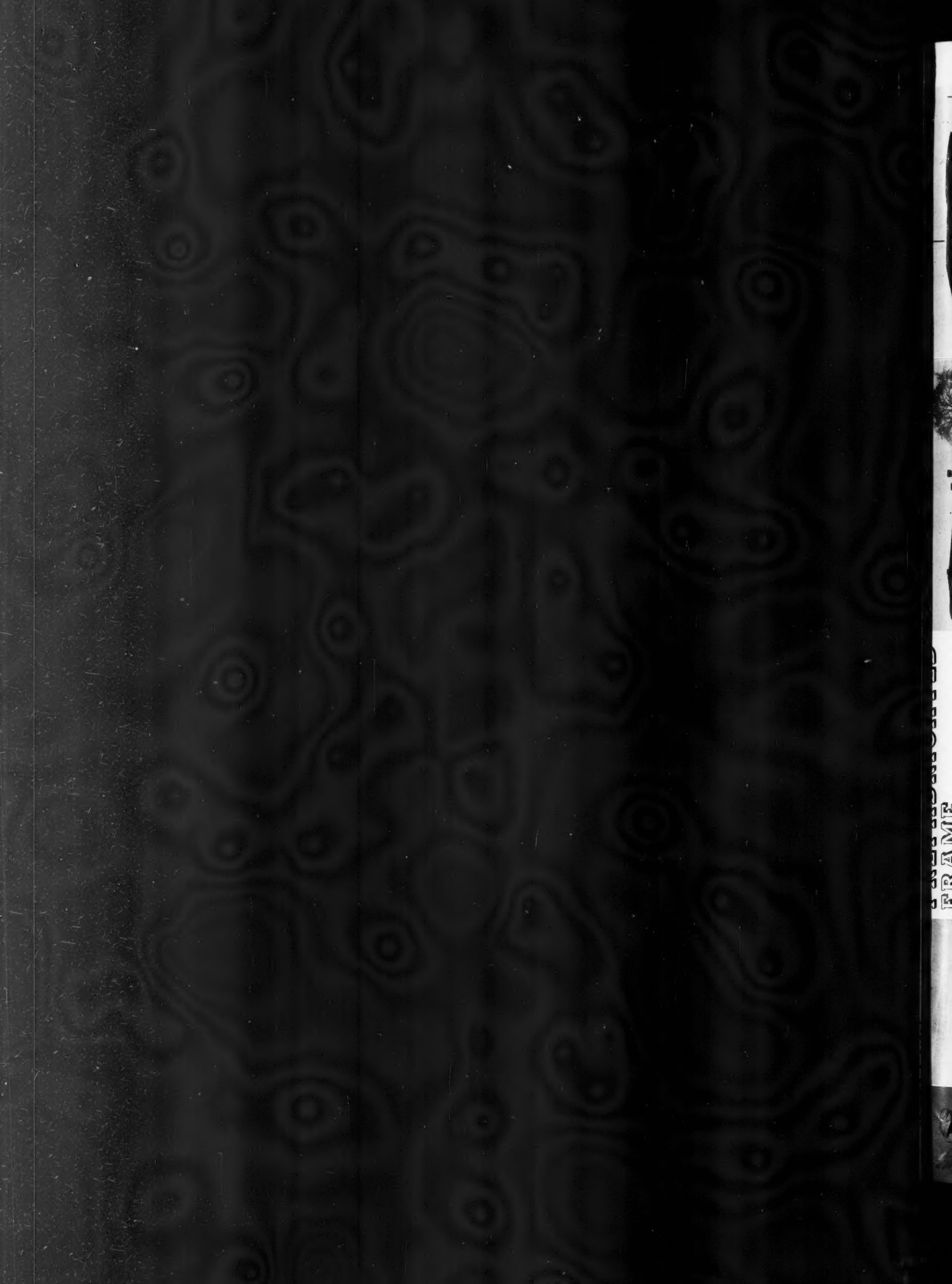
- Top Left Room:** Labeled "ROOM 6'-8 1/2" x 8'-6 1/2" MOODING". Contains a "TV" and a "Sofa".
- Top Right Room:** Labeled "ROOM 6'-8 1/2" x 8'-6 1/2" MOODING". Contains a "TV" and a "Sofa".
- Bottom Left Room:** Labeled "ROOM 9'-8 1/2" x 10'-10 1/2" MOODING". Contains a "TV", a "Sofa", and a "Coffee Table".
- Bottom Right Room:** Labeled "ROOM 9'-8 1/2" x 10'-10 1/2" MOODING". Contains a "TV", a "Sofa", and a "Coffee Table".

The plan also shows a central hallway, a kitchen area with a sink and stove, and a bathroom. Dimensions for various sections are provided, such as 18'-0" for the top section, 18'-0" for the bottom section, and 18'-0" for the central hallway area.



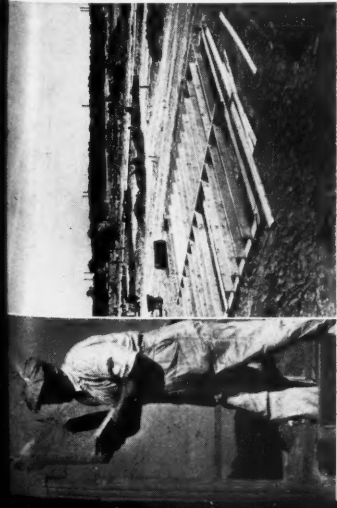


7



FRAME  
PAPER





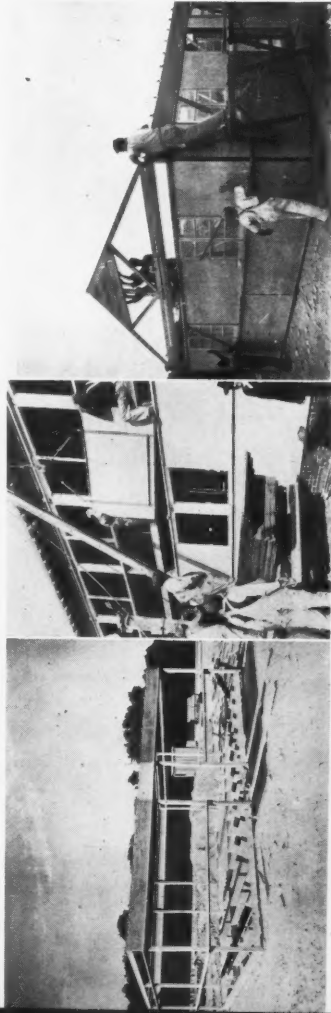
## FRAME CONSTRUCTION

In the system shown, 88 to 91, the panels were used as the stressed members. There are two disadvantages in this system: it tends to restrict the size of the building to the strength of the panels themselves; and during the process of erection panels which stiffen each other have to be braced until all are in place. Failure to do so, or carelessness in the bracing operation, may be lessened in the framing system, on the other hand, there are no limits to size beyond those imposed by the frame, and, once the frame is erected and braced, the panels do not require the temporary bracing. Both methods are used extensively; the first being more limited in size. The limitation imposed by the frame seldom apparent in domestic and small public buildings.

In timber the U.S. have evolved some ingenious systems of framed construction. One of these, known as the Cemesto system, has been extensively used in both one- and two-storey buildings. A section through an external wall is shown on page 56. The panel infilling is of Cemesto faced externally with a fine cement rendering and internally with plywood; the Cemesto board itself having a high degree of thermal insulation. The board has these finishes applied in the factory. It can be easily cut out and sawn.

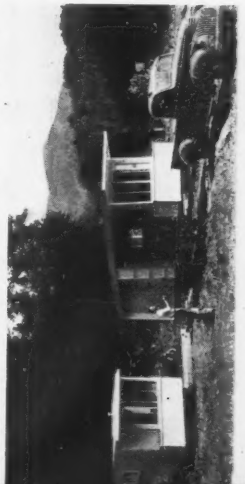
Site erection proceeds in the normal way, and the joisted floor is carried on beams and piers, 92. The frame is extremely simple and quick to erect; plywood is nailed between the head of the sill and the roof plate to form a beam, 93, the ply acting as a girth which stiffens the structure. The girth forming the continuous sill should be noticed, 94. This type of frame gives great flexibility in the arrangement of windows.

The insertion of the wall units is then a simple matter. The roof trusses—factory fabricated—are lifted into position, 95. This can be done before or after the wall panels are fixed. The units in this case are standardised, and as few joints are made the panel as possible. They are caulked or weather stripped. American methods of caulking, and the use of the caulking gun, are much in advance of our own methods, and compounds are available which remain mastic over a number of years. The size of the panels themselves is shown in the erection of a two-storey building, 96. Their height corresponds with the vertical height between the continuous horizontal girths. In this case the panels are stacked on a lorry which incorporates a gantry: the lorry travels round the building and the erectors follow it at first floor level.



## COMPLETE FACTORY ASSEMBLY

In the comic strips the joke about the house being delivered in a plain van with the water running in the bathroom has now been replaced by: "You'll not miss my house, it's the only one made entirely from poly-vinyl chloride in the avenue." The next step in the process of factory-made buildings is implicit in this crack: if the parts can be made there, why not assemble the whole thing and give



the house a ride to its destination? It is really a compromise between the trailer and the demountable house; neither is entirely satisfactory; the first is too small or, to be tactful, too compact, and the second is not always so easy to take down. So while the trailer was expanded to take the family, another type was completely built in the factory and delivered to the site in slices—as many as were necessary. This latter system proved extremely satisfactory where labour was scarce and they were, in fact, easy to remove.

The Tennessee Valley Authority has used sectional houses extensively, and has removed and re-erected them several times. Most of the units naturally conform to a rigid plan since their attachment to each other, and their rigidity during erection, and, most of all, their size, are the governing factors.

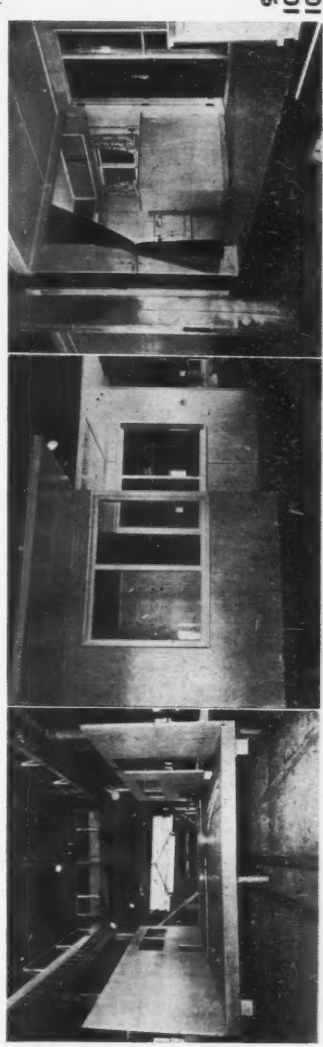
The plan is usually—in the one- and two-bedroom units—divided in the middle by a rack of cupboards and the service unit (see page 56). The two halves are fabricated complete, the cupboard unit forming the joining section, 97. The truck is backed up to the first section which is resting on a timber foundation frame. This provides a rigid bearing to the unit which is slid along it and bolted in position.

The plan and section of this little bungalow are very ingenious and have formed a model for subsequent efforts in the same direction, both in this country and America. An interior view shows the cupboard section, 101, of the kitchen; the furniture and equipment, being built in, helps to stiffen the structure—both in the external and partition walls. The lessons learned in space utilisation in the caravan have not been forgotten.

Architecturally these houses are very satisfactory. Deep caves, well proportioned window units, and the scale given by the pattern of the plywood panels, make them more attractive than other synthetic systems. Moreover the system lends itself very well to mass production. In the factory the unit is built up in successive stages, rather like aeroplane assembly lines, and moves eventually on a trolley in the final stages, 101.

The expandable trailer is the same principle in reverse as it were. The Palace trailer (plan page 56) is spacious and well equipped. For transport it is folded, and when put down on the site, the two sides flap up to form the roof, the ends are hinged outwards and the external wall hinges upwards from the floor, 98. It is as simple as it is ingenious, 99.

Europe will stand in need of such ideas after the war. With her own factories shattered and without the tools or the plant necessary for this kind of production it is to America and England that help will be looked for. There is a tremendous job for these wartime assemblies, whether caravans or houses after the war. Their utility has only just begun. But both in America and this country these houses will be needed, and unless they are still being produced it is unlikely that there will be any exportable surplus. Yet they lend themselves



PREFABRICATED  
FRAME  
CONSTRUCTION





## PRE-FABRICATED FRAME CONSTRUCTION

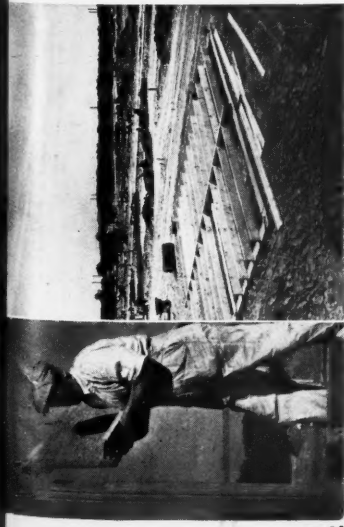
In the system shown, 88 to 91, the panels were used as the stressed members. There are two disadvantages in this system: it tends to restrict the size of the building to the strength of the panels themselves; and during the process of erection panels which stiffen each other have to be braced until all are in place. Failure to do so, or carelessness in the bracing operation, may be dangerous, and lives have been lost in this way. With a framed system, on the other hand, there are no limits to size beyond those imposed by the frame, and, once the frame is erected and braced, the panels do not require the temporary bracing. Both methods are used extensively; the first being more limited in size. The limitation imposed by the frame is seldom apparent in domestic and small public buildings.

In timber the U.S. have evolved some ingenious systems of framed construction. One of these, known as the Cemesto system, has been extensively used in both one- and two-storey buildings. A section through an external wall is shown on page 56. The panel infilling is of Cemesto faced externally with a fine cement rendering and internally with plywood; the Cemesto board itself having a high degree of thermal insulation. The board has these finishes applied in the factory. It can be easily cut out and sawn.

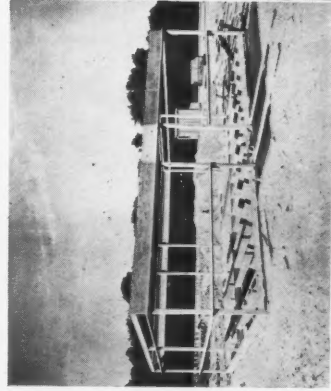
Site erection proceeds in the normal way, and the joisted floor is carried on beams and piers, 92. The frame is extremely simple and quick to erect; plywood is nailed between the head of the sill and the roof plate to form a beam, 93, the ply acting as a web which stiffens the structure. The girth forming the continuous cill should be noticed, 94. This type of frame gives great flexibility in the arrangement of windows.

The insertion of the wall units is then a simple matter. The roof trusses—factory fabricated—are lifted into position, 95. This can be done before or after the wall panels are fixed. The units in this case are standardised, and as few joints are made in the panel as possible. They are caulked or weather stripped. American methods of caulking, and the use of the caulking gun, are much in advance of our own methods, and compounds are available which remain mastic over a number of years.

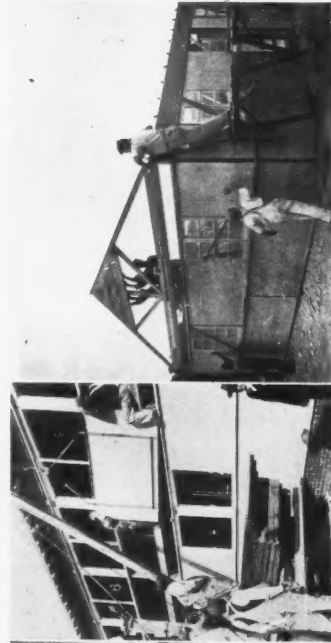
The size of the panels themselves is shown in the erection of a two-storey building, 96. Their height corresponds with the vertical height between the continuous horizontal girths. In this case the panels are stacked on a lorry which incorporates a gantry: the lorry travels round the building and the erectors follow it at first floor level.



91  
92



93  
94  
95



## COMPLETE FACTORY ASSEMBLY

In the comic strips the joke about the house being delivered in a plain van with the water running in the bathroom has now been replaced by: "You'll not miss my house, it's the only one made entirely from poly-vinyl chloride in the avenue." The next step in the process of factory-made buildings is implicit in this crack: if the parts can be made there, why not assemble the whole thing and give



96  
57



97  
98

the house a ride to its destination? It is really a compromise between the trailer and the demountable house; neither is entirely satisfactory; the first is too small or, to be tactful, too compact, and the second is not always so easy to take down. So while the trailer was expanded to take the family, another type was completely built in the factory and delivered to the site in slices—as many as were necessary. This latter system proved extremely satisfactory where labour was scarce and they were, in fact, easy to remove.

The Tennessee Valley Authority has used sectional houses extensively, and has removed and re-erected them several times. Most of the units naturally conform to a rigid plan since their attachment to each other, and their rigidity during erection, and, most of all, their size, are the governing factors.

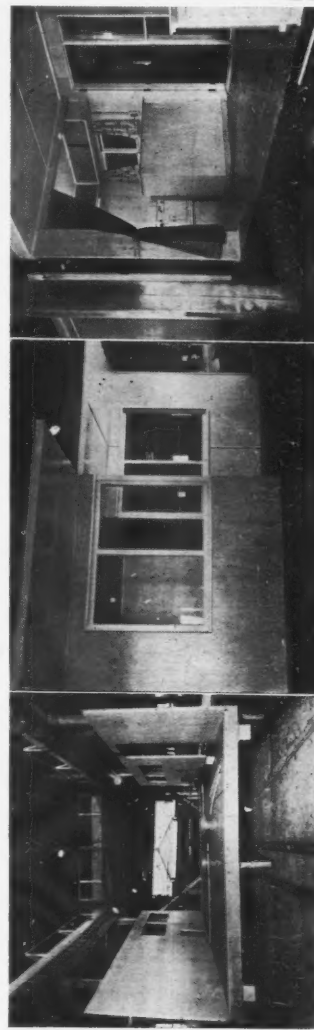
The plan is usually—in the one- and two-bedroom units—divided in the middle by a rack of cupboards and the service unit (see page 56). The two halves are fabricated complete, the cupboard unit forming the jointing section, 97. The truck is backed up to the first section which is resting on a timber foundation frame. This provides a rigid bearing to the unit which is slid along it and bolted in position.

The plan and section of this little bungalow are very ingenious and have formed a model for subsequent efforts in the same direction, both in this country and America. An interior view shows the cupboard section, 101, of the kitchen; the furniture and equipment, being built in, helps to stiffen the structure—both in the external and partition walls. The lessons learned in space utilisation in the caravan have not been forgotten.

Architecturally these houses are very satisfactory. Deep eaves, well proportioned window units, and the scale given by the pattern of the plywood panels, make them more attractive than other synthetic systems. Moreover the system lends itself very well to mass production. In the factory the unit is built up in successive stages, rather like aeroplane assembly lines, and moves eventually on a trolley in the final stages, 101.

The expandable trailer is the same principle in reverse as it were. The Palace trailer (plan page 56) is spacious and well equipped. For transport it is folded, and when put down on the site, the two sides flap up to form the roof, the ends are hinged outwards and the external wall hinges upwards from the floor, 98. It is as simple as it is ingenious, 99.

Europe will stand in need of such ideas after the war. With her own factories shattered and without the tools or the plant necessary for this kind of production it is to America and England that help will be looked for. There is a tremendous job for these wartime assemblies, whether caravans or houses after the war. Their utility has only just begun. But both in America and this country these houses will be needed, and unless they are still being produced it is unlikely that there will be any exportable surplus. Yet they lend themselves



99  
100  
101

admirably to transit by ship, by road and rail. We should be taking steps now to see that the occupied countries will get the shelters they need, directly the war recedes.

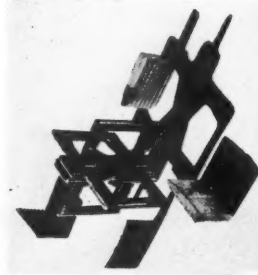
## GENERAL PANEL SYSTEM

Any prefabricated system has first of all to satisfy certain fundamental requirements—performance standards, as the Burt Committee calls them. These standards include thermal insulation, moisture resistance and stability. There is no doubt in America that prefabricated systems can satisfy these standards as well as orthodox systems; but they may not be cheaper. A good deal of the cost of a prefabricated system when once it is in the erection stage depends upon the ease with which the units can be fixed to one another.

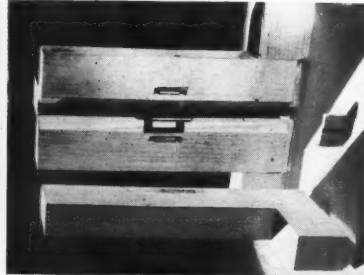
If the practice of clipping is adopted, the use of nuts and bolts and methods of assembly involving hand tools and a certain amount of fitting can be eliminated, and much time and labour will thus be saved. In aircraft construction much progress has been made and sprung metal clips are extensively used: prefabrication is going through the same phase. A specially ingenious device is the clip, 102, which the General Panel Corporation has evolved for fixing panels together in three dimensions.

It consists (see page 55) of three slotted metal pieces interlocking to form a cross. The interior and exterior panel units are built up on the same basic frame and slots are cut to receive the metal cross which is dropped into position. The panels are slid together and pre-cut wedges knocked in, 103. Only a hammer is required for erection, it is claimed, and the units are equally easy to dismount. The completed structure is equally ingenious; it is based on a module of 3 ft. 4 in., and the number of different structural units has been reduced to four, which are used in different combinations. The system is still in an experimental stage, and has not yet been so extensively used as some of the earlier types. It illustrates a development which is likely to be of increasing importance and one to which

But it is extremely interesting as attention is now being given.



102

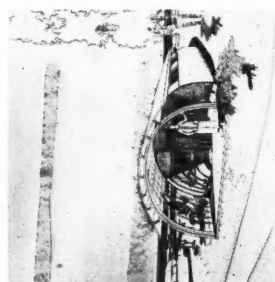


103

## VICTORY HOUSE

This dwelling unit, evolved by the J. D. Pierce foundation, avoids the use of materials likely to be in short supply. Designed to accommodate a family of four, it is scientific in principle and appears to be simple in erection (plan and section page 56). It is one of the most interesting projects that have been evolved; it should prove simple in transit and would have a good climatic range, 104.

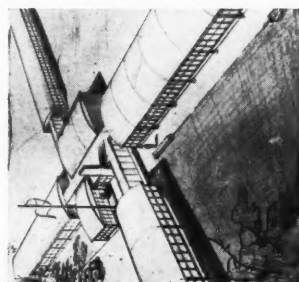
It is an arched construction of laminated wood at 4 ft. centres. These are lined, both internally and externally, with pulp boards with a blanket type of thermal insulation between. A third skin of pulp board impregnated with asphalt is supported above the arches so as to provide a circulating air space between the two. This makes the unit cool in summer, while in winter the vents are closed and enclose an additional air space.



104

## RATIO STRUCTURES

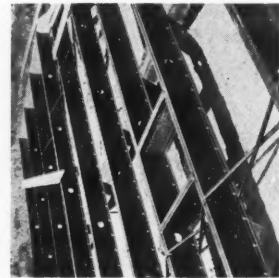
This system is more complicated, but has a wider range of applications, as the roof spans can be varied. It would seem to be applicable to community centres, schools and other assembly buildings as well as to houses. It is approved by the Federal Public Housing Authority, although it has not been extensively used. It is a framed structure which consists of timber posts with sectionalised roof units which are assembled with a tie, to form a truss. Plywood gussets unite posts and truss, 105. As the panel units for the walls are not structural, the arrangement of the windows can be easily varied and a number of different materials used for the wall units. Like the Victory shelter, this system appears to be suitable for export and may perhaps help in the regeneration of Europe. Aesthetically, the design



105



109



110

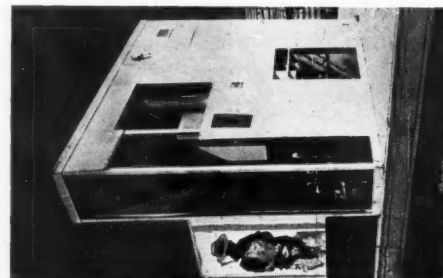
## STRAN STEEL

Metal systems of construction are rarely employed. This is understandable; steel is in short supply and cannot be used for housing projects, and the same applies to non-ferrous metals. But it is a pity, all the same, because the years before the war, and particularly the early thirties, saw a considerable number of steel houses—generally of the panel type.

Stran steel (see page 55) is a system of steel framing rather than a complete constructional system. With modifications one can use various materials with it—either solid infillings or board linings. Stran steel is made from cold rolled strip of thin gauge. Two sections are rolled in such a way that they form an I section when placed together. By further rolling and punching they are locked. The applications of this system are considerable; it can be used for walls and roofs or for floor decks where the steel strips in the form of herringbone strutting, 111. Another advantage which helps to give this system something of the flexibility of timber is that the method of joining the metal sections allows nails to be securely driven in the joint. The section has a longitudinal roll, and a nail driven in bends around the joint and obtains a good hold. The upper illustrations compare Stran steel, 109, with a timber framing system, 110.

## UNIT EQUIPMENT

Equipment is always an expensive item. It is tricky to fix and complicated services have to be run to it. American firms have been experimenting for some years with the production of complete factory-made service units. In these the equipment and the services are connected up in the factory and the unit delivered with only the site connections to be made. While these units can be manufactured for bathroom and kitchen assemblies, 112, there still remain the electric wiring and central heating pipes. Usually these are installed after the building's carcassing is complete, but in several prefabricated schemes the wiring and the service pipes are pre-run and connections made as the units are assembled. Here again prefabrication tends to follow the practice established for car and aeroplane. American wiring regulations make such departures much easier than in this country. Here  $\frac{1}{2}$  in. steel conduit always looks strong and rigid enough to act as 112 the structural frame; it creates difficulties in prefabricated systems which are not justified by the advantages claimed for it. American methods of wiring, 115, are flexible, and the spiral protection of the cable is easily bent and run. The neatness of the plumbing assembly in 115 is worth imitating. In this country our standards of equipment are nothing like as high as those in America. There are not the same extremes of climate which make a refrigerator a necessity in an American summer; we do not live by hire purchase to the same extent. But the bathroom, 113, and the kitchen, 114, show better designed units with better finishes than are customary in subsidised housing in this country. An enclosed bath, a low-level flushing cistern—these are the luxuries of the middle-class in England. And the same high standards are to be seen in the



materials used for the wall units for export and may perhaps help in the regeneration of Europe.



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106



107  
108



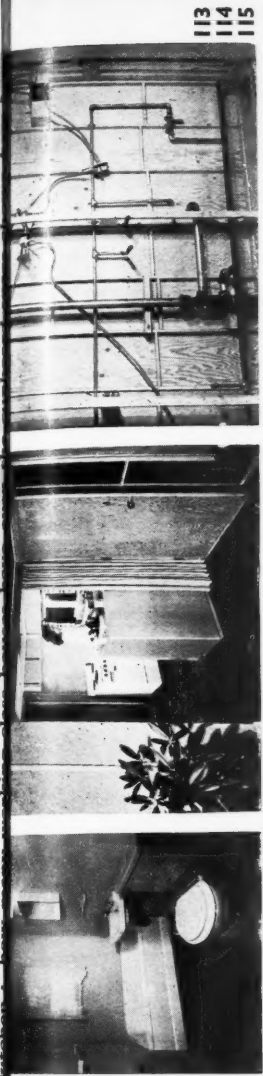
## BALLOON HOUSES

For originality of constructional methods, fantasy of form and ingenuity of plan, the celebrated balloon house is unique. Unfortunately the merits of the system were obscured in the sensational publicity which these constructional methods aroused. Even during a hot phase of the war, these houses took some space in the dailies, and gave everyone a good gape. But astonishment gave place to a certain respect when such unconventional methods were shown to be practical. How much it would cost, what the performance standards were likely to be, were left unanswered by the popular press. There is still some doubt about its thermal insulation.

A circular base of concrete or brickwork is laid, and a light-weight rubber balloon is attached. This balloon when inflated, 107, becomes the formwork for the concrete. After the balloon has been blown up wire mesh reinforcement is fixed to it, and concrete is then sprayed over the mesh. When this has set the bag can be deflated, withdrawn, and re-used as formwork once again. Timber centering can be inserted wherever windows and doors are required.

These human beehives are ingeniously arranged, and one type of completed house is illustrated, 108. There are many variations possible; this one consists of two hemispheres with a living room in one and two bedrooms in the other. The unit connecting them is conventionally built and has an entrance hall, kitchen and bathroom. Applications of it were suggested for army shelters; it would probably make a nice change from a bell tent.

114, show better designed units with better finishes than are customary in subsidised housing in this country. An enclosed bath, a low-level flushing cistern—these are the luxuries of the middle-class in England. And the same high standards are to be seen in the

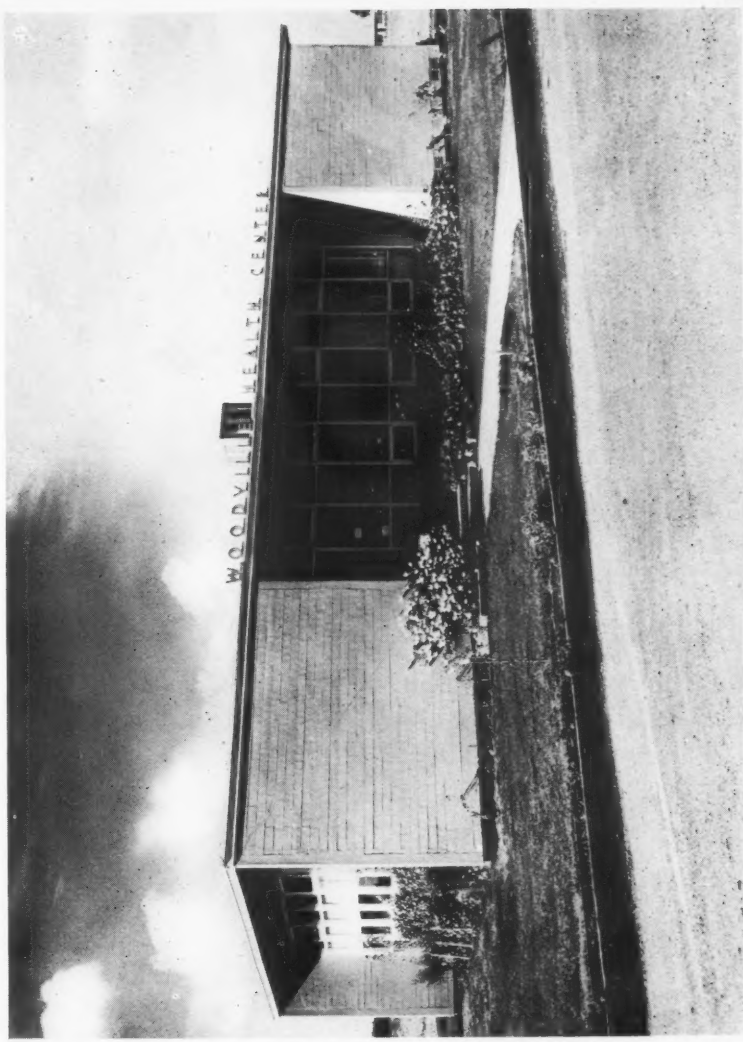


113  
114  
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## IN THE LIGHT OF ENGLISH EXPERIENCE

A survey of U.S. wartime housing as comprehensive as this, hands us a sharp jolt on the chin. It comes at an apposite moment when we are getting ready to focus on post-war problems. It reminds us that the U.S., in the midst of a terrific war output—it takes even the slickest radio commentator about five minutes to reel off the number of aircraft and guns and tanks produced—has managed to build enough housing for a million and a half war workers, or about eight million of the population. That was by March, 1943. It was achieved in all sorts of ways—by converting existing structures, by erecting temporary buildings, by a complete mobilisation that brought in everything that could be used for building and spared from war. These figures, and the standard of housing design, make the post-war outlook very hopeful indeed.

We are at a moment in the history of the war when we begin to look forward to peace. The phenomenal U.S. housing output is to be interpreted as an omen of the future and not as an emblem of the past. The number of houses that each country has to build are still problematical. In America it is estimated that some ten or eleven millions of new houses are required. In this country official estimates put our deficit at three and a half to four



116



million, and unofficial ones at ten. And how many millions more will be required in Europe when the fighting is over? One thing is certain; they will be needed quickly, if pestilence and famine are to be avoided or defeated.

It is for this reason that the American example is of such importance. It shows that it is possible to produce houses quickly, with a high standard of performance and with excellent equipment. It shows that even where time is important and the maximum output necessary, that planning can speed up the operation and make it more efficient. It shows that architects and technicians, when given the opportunity, can produce well-planned schemes which will help to create a vital and progressive community. This wartime housing in the U.S. should focus our minds on the post-war job.

However, what a study of American procedure also reveals is that America is very different from England. Because the building regulations are in the same language, one is apt to assume that they will be more or less similar. They are not, even though a good deal of U.S. Housing legislation has been based on our own. Housing regulations in this country are fairly uniform, and a house designed for occupation in Carlisle would probably work out satisfactorily if it were built in Devon. The climate and the social conditions do not vary widely. But in America there is a cold North and a semi-tropic South; there is Boston, Massachusetts and San Diego, California, and the variation in the climatic conditions dictate differences in planning, in construction, in standards of performance. There are no universal building laws—no standard patterns of building. All this comes out in the photographs on the preceding pages.

In so large a political unit, moreover, and with so many different States, the degree of centralisation—the extent to which a practice can be made uniform—must be less than in this country. The men on the spot, the local architects, must be allowed to adapt their instructions to the exigencies of the region. There is far less uniformity, far more scope given to innovations and experiment in planning and design than appears in England. The architects for a lot of these projects have used this latitude to good effect, and the authorities seem usually to have picked the right kind of man for this work. There are also some thoroughly bad examples which look like a revival of the Klondike rush.

It is not only that social habits are different in the United States from ours, but that they differ throughout the States. In the West, for instance, the pioneering tradition still continues. Also the Americans live more in public than we do. They go out more, eat out more, and their children run from one neighbour's house to another unconfined by garden fences. This is reflected in the liberal allowance that is made—after a brief and disastrous interlude during which it wasn't—for community centres and clinics. It was soon realised that absenteeism and discontent were much reduced when such services were provided. Then the English tradition of the individual garden does not exist to the same extent. To the American there is something inexpressibly comic in a man settling down to cultivate his lawn. In most of the houses illustrated the individual garden largely consists of a little strip for clothes drying. But the popularity of the *Zeilenbau* System (parallel blocks with the service roads set at an angle to them) is partly accounted for by this tradition, as it provides a communal open space in front of the houses. These spaces are usually kept up by the local authority.

The methods used in the building industry are very different over there. Not only do they alter between one State and another, but the industry as a whole is more highly mechanised, as is indicated by the report of the British Mission. There is a well-developed and carefully fostered tradition of timber building, particularly in the West. We have never used timber extensively for building in this country, and there still remains an irrational prejudice against it. Some of the new American houses show that the timber vernacular is sufficiently flexible to assimilate prefabricated methods of construction. The timber technique in U.S. is original and progressive, and has made a great contribution to wartime housing—the majority of the schemes are of timber construction.

In some ways the most interesting aspect of the wartime programme is the development in site planning. Before the war, apart from the characteristic layout of *zeilenbau* and cul-de-sac, site planning was based upon the English garden city. The Greenbelt towns and Radburn in certain respects are superior, but the attempt to plan the wartime communities on similar lines soon led to a more realistic approach. The largest of these new communities is Vanport City, with a population of 40,000, and this forms a complete, self-contained unit. More commonly, however, wartime housing has been built on the fringe of some existing urban centre, in the form of what might be called neighbourhood units.

Within this unit the site planning is generally good. In most cases land unsuitable for

available on such a scale that even the clearing and grading of sites like Channel Heights becomes an economic proposition. Then the use of the residential precinct system reduces the length of traffic road to a minimum; in some cases to one-tenth of that required with the continuous road system. Both these factors should be borne in mind when we come to plan our own new areas.

The Americans have a wide range of sites to choose from, and looking at some of them one has the feeling that England is very small, and very much built over, and that our biggest problem will be to know where to put everything and leave a bit of country just to look at. Our garden cities are overplanted and our jerry-built estates as barren as prairies; the same seems to be true in America. Wherever possible their houses are placed in well-wooded areas, and this helps the houses tremendously. In Marin City, while the layout is as good as human wit can devise, the appearance is sordid, largely owing to the absence of trees.

The planning of the majority of the houses is excellent. Local conditions are treated sympathetically; on the east coast the planning follows our own tradition of small separate rooms. But in the warm and expansive West the living room and the kitchen are often combined to get a through draught. The majority of the plans show one- and two-bedroom house types—even where they are of permanent construction. It is difficult to understand the reasons for this, unless the American family either consists of parents and one child or of parents and two children of the same sex. But there are probably other factors, for instance, the average age of the migrants, which account for this. In general, the house plans, while they are always ingenious and generally possess ample storage space, are so different from our own that comparison is difficult. As the front door almost invariably opens directly into the living room one can only infer that it is never used or that central heating is so effective that draughts are unknown. The equipment is palatial by our standards—even in the temporary houses. None of our own subsidised housing can compare with the American kitchen and bathroom which seem to possess almost everything including sex appeal.

It would be interesting to know the proportion of new buildings built during the war which are based upon timber construction. With the exception of the trailer houses it is almost universal, whether for the permanent, the prefabricated or the demountable types. Most of them are based on a frame with various types of building board as a lining. Concrete is seldom used—in the Cemesto system as a cement rendering and only in the beehive house in mass form. Steel has naturally been eliminated since the war. This makes an interesting contrast with our own experiments as the shortage of timber has tended to concentrate development on steel and concrete systems. Timber is the ideal material for the job the Americans had in hand—and well they used it. The traditional timber techniques have been adapted to factory production, and the variety of pattern, texture and colour shown in these buildings is endless. The experience which the Americans have had should be useful after the war. Many of these systems are convenient for transport, and do not require extensive or elaborate plants for their manufacture.

The most surprising thing about this American housing is the relatively high standard of design. This is to be seen in the communal buildings, and in the trailers as well as in the houses. Details like windows and eaves are crisp and sharp; there is nothing superfluous. The designs are confident and assured, and make the most of the possibilities inherent in the constructional system. It is impossible to pick out any one design where the general standard is so even. We can only hope that when the time comes we shall do as well.

More important, perhaps, the American achievement demonstrates that mass production, when efficiently devised and controlled, can improve popular standards and taste. With mass-production methods it pays to employ good designers because the manufacturer is faced with a large potential loss if he has to retool his plant when once production has started. It also shows that standardisation does not necessarily mean monotony, and the absence of individuality and personal taste. Colour, texture and pattern remain—as it does in brickwork—as well as the variations imposed by the site, the climate and the occupants.

The wartime brought together and crystallised all the ideas on building technique and layout which had been the subject of experiment and speculation in the preceding decade. It was a magnificent opportunity for a try-out; there was nothing to lose and everything to gain by treating the programme in this way. Channel Heights, New Kensington, Marin City, and the rest of them are an essay in community planning, just as the buildings represent the first serious attempt on a large scale to apply modern methods of manufacture and erection. It is for this reason that this wartime achievement fills one with hope. America succeeded in carrying out a vast emergency programme, and if we show the same initiative and energy we may be able to solve our own housing problem, and to help the rest of Europe



## AMERICAN ANTHOLOGY

### Pastoral Pioneers

The island of Nantucket lies in latitude  $41^{\circ} 10'$ , 60 miles S. from Cape Cod ; 80 miles S. from Boston ; 120 from Rhode Island ; 800 N. from Bermudas. Sherborn is the only town in the island, which consists of about 530 houses, that have been framed on the main ; they are lathed and plastered within, handsomely painted and boarded without ; each has a cellar underneath, built with stones fetched also from the main : they are all of a similar construction and appearance ; plain, and entirely devoid of exterior or interior ornament. I observed but one which was built of bricks, belonging to Mr. —, but like the rest it is unadorned. The town stands on a rising sandbank, on the west side of the harbour, which is very safe from all winds. There are two places of worship, one for the Society of Friends, the other for that of Presbyterians ; and in the middle of the town, near the market-place, stands a simple building, which is the county court-house. The town regularly ascends toward the country, and in its vicinage they have several small fields and gardens yearly manured with the dung of their cows, and the soil of their streets. The streets are not paved, but this is attended with little inconvenience, as it is never crowded with country carriages ; and those they have in the town are seldom made use of. At my first landing I was much surprised at the disagreeable smell which struck me in many parts of the town ; it is caused by the whale oil, and is unavoidable ; the neatness peculiar to these people can neither remove nor prevent it. There are near the wharfs a great many store-houses, where their staple commodity is deposited, as well as the innumerable materials which are always wanted to repair and fit out so many whalers. They have three docks, each three hundred feet long, and extremely convenient ; between these docks and the town, there is room sufficient for the landing of goods, and there is room around for 300 sail of vessels. When their fleets have been successful, the bustle and hurry of business on this spot would make you imagine that Sherborn is the capital of a very opulent and large province.

There are but few gardens and arable fields in the neighbourhood of the town ; for nothing can be more sterile and sandy than this part of the island ; they have, however, with unwearied perseverance, by bringing a variety of manure, and by cow-penning, enriched several spots where they raise Indian corn, potatoes, pumpkins, turnips, etc. On the highest part of this sandy eminence, four windmills grind the grain they raise or import ; and contiguous to them their rope walk is to be seen, where full half of their cordage is manufactured.

This island was patented in the year 1671, by twenty-seven proprietors, under the province of New York. They found it so universally barren and so unfit for cultivation, that they mutually agreed not to divide it, as each could neither live on, nor improve, that lot which might fall to his share. They then cast their eyes on the sea, and finding themselves obliged to become fishermen, they looked for a harbour, and having found one, they determined to build a town and to dwell together. For that purpose they surveyed as much ground as would afford to each a home lot. Forty acres were thought sufficient to answer this purpose ; for to what end should they covet more land than they could improve, or even inclose. This was all the territorial property they allotted ; the rest they agreed to hold in common. Each proprietor should be entitled to feed on it if he pleased 560 sheep. By this agreement the national flock was to consist of 15,120. Further they agreed, in case the grass should grow better by feeding, that the four sheep should represent a cow, and two cows a horse.

Such was the method this wise people took to enjoy in common their new settlement ; such was the mode of their first establishment, which may be truly and literally called a pastoral one.

J. HECTOR ST. JOHN DE CRÈVECOEUR (*Letters from an American Farmer*, 1782).

### Industrial Pioneers

I went down to-day by the Iron Mountain Railroad—was switch'd off on a side-track, four miles through woods and ravines, to Swash Creek, so-call'd, and there found Crystal City, and immense Glass Works, built (and evidently built to stay) right in the pleasant rolling forest. Spent most of the day, and examin'd the inexhaustible and peculiar sand the glass is made of—the original whitey-grey stuff in the banks—saw the melting in the pots (a wondrous process, a real poem)—saw the delicate preparation the clay material undergoes for these great pots (it has to be kneaded finally by human feet, no machinery answering, and I watch'd the picturesque bare-legged Africans treading it)—saw the molten stuff (a great mass of a glowing pale yellow color) taken out of the furnaces (I shall never forget that Pot, shape, color, concomitants, more beautiful than any antique statue) pass'd into the adjoining casting-room, lifted by powerful machinery, pour'd out on its bed (all glowing, a newer, vaster study for colorists, indescribable, a pale red-tinged yellow, of tarry consistence, all lambent), roll'd by a heavy roller into rough plate glass, I should say ten feet by fourteen, then rapidly shov'd into an annealing oven, which stood ready for it. The polishing and grinding rooms afterwards—the great glass slabs, hundreds of them, on their flat beds, and the see-saw music of the steam machinery constantly at work polishing them—the myriads of human figures (the works employ'd four hundred men) moving about, with swart arms and necks, and no superfluous clothing—the vast, wide halls, with immense play of shifting shade, and slow-moving currents of smoke and steam, and shafts of light, sometimes sun, striking in from above with effects that would have fill'd Michel Angelo with rapture.

Coming back to St. Louis this evening, at sundown, we followed the Mississippi, close by its western bank . . .

WALT WHITMAN (*November Boughs*, 1888).

## MARGINALIA

### Prefabrication in Britain Up-to-date

The term "prefabrication" is chiefly used nowadays to signify building methods using factory-made wall units substantially larger than bricks. The following notes only include systems which have been made public, and are confined to the carcass of the house. Prefabricated service units are excluded.

In the years 1918 to 1939 various "unorthodox" methods, substituting concrete, timber, steel or cast iron for brickwork, were adopted in house construction ; many of them were based on prefabrication. These systems are described in Post-War Building Studies No. 1, *House Construction*, published for the Ministry of Works by H.M.S.O., London, 1944, 2s.

During the present war, particularly in the last two years, further development has taken place, and many experimental houses in different systems have been erected all over the country, some of them temporary houses, but some semi-permanent and permanent structures too. The degree of prefabrication also varies.

1. A typical example of what may be called part-prefabrication is Mr. Sam Bunton's *Unit-Construction*, *Architects' Journal*, January 28, March 4, 1943, pp. 75-78, 160. Experimental Building at Kilmarnock. It consists of external wall units of 80 in. by 40 in. by 8 in. thick, composed of an outer and an inner face of 1 in. thickness with a cavity of 6 in. Both faces are made of Gypklith, a wood-wool and cement composition, and are finished with different type of rendering in the factory. The 6 in. cavity is used for the accommodation of reinforced concrete columns and beams, cast on the site. Thus the resulting building is a reinforced concrete framework, and the function of the prefabricated wall units is weather-proofing and insulation, but not loadbearing. The floor and roof units between the beams are also of Gypklith. The system allows a great variation in layout, height and elevation.

2. An example of 100 per cent. prefabrication is the *Tarran* system, *Architects' Journal*, November 18, 1943, pp. 378-9, and *Architectural Design and Construction*, July 1944, pp. 154-157. An experimental house has been erected at Hull. The floor units (approximately 12 ft. long by 4 ft. wide) are composed of a frame of light pressed channel section galvanised steel with joists of pressed steel or laminated timber. The flooring may be of laminated timber or hard fibre board. The wall units are of one storey height (usually 8 ft.) by 1 ft. 4 in. wide, having a reinforced cast stone or concrete panel in laminated resin bonded timber frames. In an earlier form of the system they were of lignocrete, a composition made of sawdust and cement. The external finish to the units is waterproofed and may be of any colour. The joints are made with an asphaltic asbestos-wool jointing material, fixed in the factory and sealed by an electrically heated caulking tool. The roof can be flat or pitched up to about  $12^{\circ}$ . The roof units are similar to those of the floor. The internal wall units are of resin bonded laminated timber covered with plaster board or plywood. The lining of the



A pair of Unibuilt semi-detached houses erected as experimental prototypes at Mitchell Avenue, Canley, Coventry. Architects : G. Grey Wornum and Richard Sheppard.



ceilings is similar. The maximum weight of a unit is 200 lb. The system can be adopted for schools, hospitals, etc.

3. An even lighter form of construction is the *Seco* system, *Architects' Journal*, February 17, 1944, pp. 139-140, Demonstration Cottages at Chobham, Surrey. This is of the same material throughout: the whole fabric of the building is formed by resin bonded plywood units. All components of the building can easily be handled by two men. The weight of the floor units is only 3 lb./sq. ft.

4. The emergency factory-made house by the Ministry of Works, *Architects' Journal*, May 11, 1944, pp. 345-6, 349-357, June 8, pp. 425-9, June 15, pp. 444-8, 458, June 22, pp. 461-5, June 29, pp. 481-3, July 6, pp. 5-7, exhibited at the Tate Gallery, is entirely of steel, with the exception of the boarding of the floor which is in timber, directly screwed to steel sheet joists. The walls and the roof are in pressed steel sheets. The walls are composed of panels, at the joints special mastic weathertight seatings are inserted. Within the external wall thickness is fixed faced aluminium foil on paper, mounted on a light timber frame, which will make the walls similar in insulation value to an 11 in. hollow brick wall. Internally, the wall is lined with steel in the kitchen, bathroom, w.c., and hall, and elsewhere designed to receive plyboard or other similar wall lining.

The roof has pressed metal joists at centres corresponding to the widths of the wall panels. The joists are supported on the internal spine wall.

5. The main structure of the City of Coventry experimental houses, designed

Top, The Churchill House designed by the Ministry of Works. Bottom, Terrace cottages of prefabricated unit construction on the LCC Walling Estate. Architect: F. R. S. Yorke.

under the direction of the City architect, Mr. D. E. E. Gibson, *Architects' Journal*, October 7, 1943, pp. 255-8, consists of a steel frame of tubular steel in one house and welded strip steel in the other. The trusses span between the external walls without intermediate support. The first floor consists of pre-filled metal trays mounted on rubber pads which rest upon the floor joists—an experiment to provide a high degree of sound insulation. The external wall cladding consists, on the ground floor, of tile-faced concrete slabs, and on the first floor of asbestos sheets. The complete houses have not yet been erected.

6. The system evolved by the Public Works Committee of Birmingham, *The Builder*, May 12, 1944, pp. 383-4, has also a light steel frame structure within which a permanent house interior can be constructed with any suitable materials, prefabricated or otherwise, and which can be clothed either with a temporary or permanent covering. The temporary covering may be removed and replaced by permanent materials as soon as they are available. Such houses could be quickly erected with weatherproof outer coverings, such as asbestos or pressed steel, to last for two or three years, and then be faced and roofed with more pleasing materials such as brickwork and tiles. The steel frame has no internal support so that the house interior can be entirely changed to meet varying demands.

7. The "Unibuilding" system by G. Grey Wornum and Richard Sheppard, is on similar lines, *Architects' Journal*, June 22, 1944, pp. 471-4, Experimental Houses at Canley, Coventry. Floor and roof members can span up to 24 ft. Floor slabs are of 2½ in. aerated concrete, covered with lino or composition, but if wood is available floor boards can be laid directly

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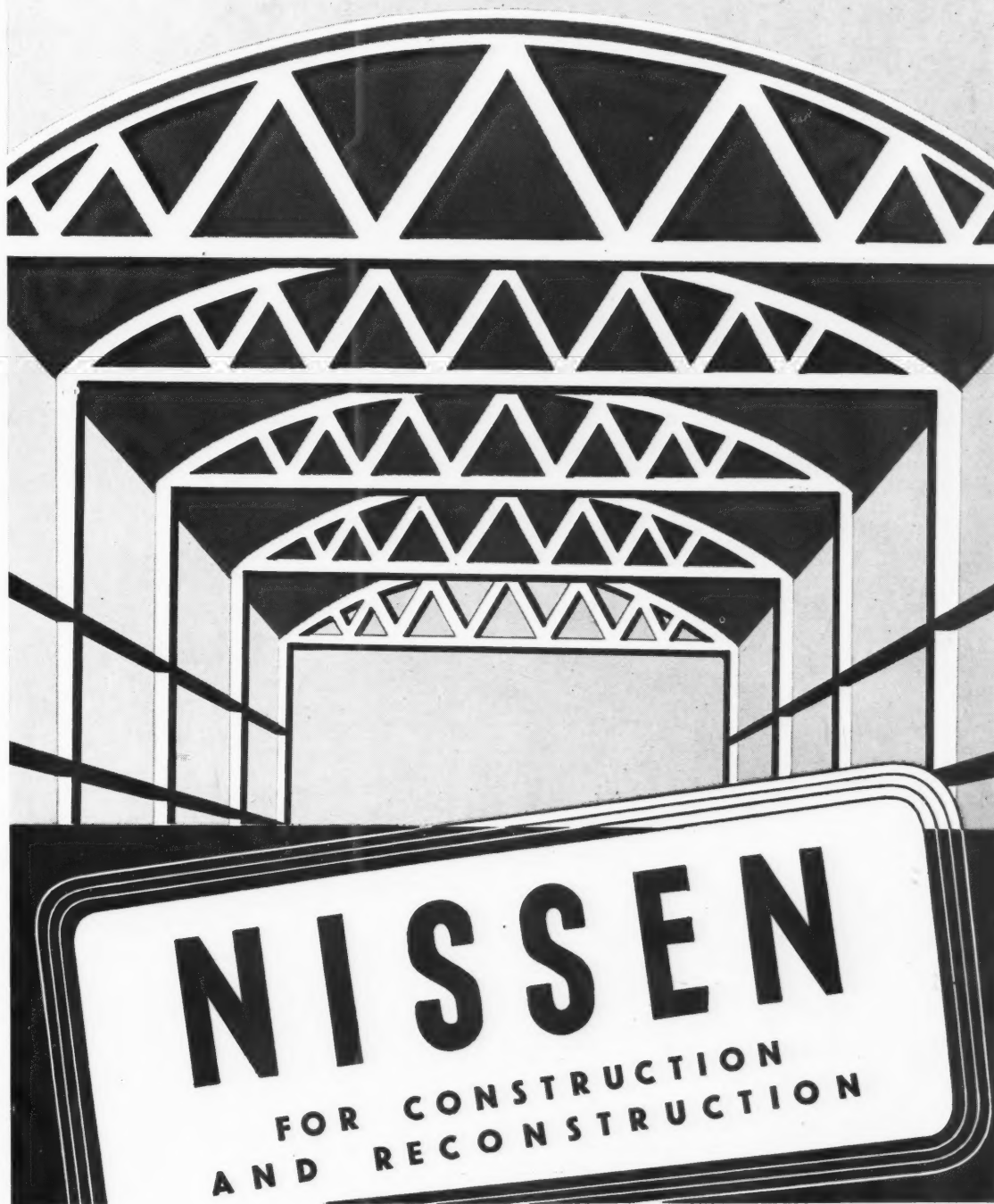
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on the trusses. Facings are asbestos cement pans 4 ft. by 2 ft. filled in the factory with 2 in. wood wool slabs. The thermal insulation provided is claimed to be almost double that of an 11 in. cavity brick wall. No unit weighs more than 100 lb.

8. The *Braithwaite Unit Construction* system, *Architects' Journal*, May 11, 1944, p. 348 and July 13, 1944, pp. 22-23, Experimental Houses on the L.C.C. Watling Estate, Hendon, designed by F. R. S. Yorke, is also a light steel framed structure, allowing a wide range of alternative material as cladding.

9. The walls of the experimental block of the Glasgow Corporation are composed of large units of foamed slag concrete (up to a size of 10 ft. by 8 ft. 8 in.) which are steam cured in the factory and erected by cranes. The floors and the flat roof are in precast reinforced concrete. The load bearing external walls are 6 in. thick, the partitions 4 in.; the external wall is roughcast on the outside and plastered inside. The thermal insulation is superior to that of an 11 in. cavity solid brick wall.

The nine systems show a great variety both in the choice of materials and in the method of construction. The framed systems allow the greatest flexibility in the layout of the rooms, and in the cladding, even after completion. These systems are similar in their conception and differ mainly in structural details, in steel profiles and unit dimensions. The opposite extreme, an entirely rigid layout, is represented by the Churchill House which excludes variation altogether. 1, 2 and 3 are based on certain unit dimensions

which allow a flexibility in the design, but no alteration at a later date. All these systems are composed of light units which can easily be assembled on the site without mechanical equipment. On the other hand, 9 is made up of large units up to 25 cwt., and has to be erected by cranes.

Regarding thermal and sound insulation, fire resistance, etc., the performances vary within wide limits, but some of the systems give a much higher standard than the traditional brick building with timber floors and roofs.

The æsthetic qualities of the various designs and experimental structures are signally uneven. The only completely convincing one from that point of view is Mr. Yorke's. Of the others only one or two can compete with the æsthetic standard set by the best of the American schemes. The Glasgow experiment is a complete replica of the traditional brick house with rendering. There is on the other hand, it seems, more technical ingenuity at work on experimental housing over here than in America, and it is for this reason that the above notes deal with construction chiefly.

#### Cast Iron News

The British Cast Iron Research

Association is opening a new department to be known as the Building Uses Department. Mr. Derek Bridgewater has been appointed consulting architect. The British Cast Iron Research Association is a voluntary association of manufacturers of castings for all purposes. It has hitherto operated through three main departments, a Research Department for acquiring new knowledge, a Development Department for carrying out that larger scale work needed to apply discoveries, and an Information Department. The Association recently acquired a country house at Alvechurch twelve miles south of Birmingham with fifteen acres of land for post-war extension.

#### Birthday Honours for Architects

Amongst those mentioned in the recent Birthday Honours conferred by the King were two well-known architects, Sir Giles Gilbert Scott, R.A., who receives the Order of Merit, and Professor C. H. Reilly who becomes a Knight Bachelor. Sir Giles Gilbert Scott, R.A., was born in 1880 and educated at Beaumont College, near Old Windsor. He was President of the R.I.B.A. from 1933-35. His principal works include Liverpool Cathedral, new buildings for Clare College, Cambridge, new Waterloo Bridge, and

extensions to the Bodleian Library, Oxford. He was knighted in 1924. Professor Reilly, Emeritus Professor of Architecture at Liverpool University, was born in 1874 and educated at Merchant Taylors' School, London, and Queens' College, Cambridge. He was Director of the Liverpool School from 1904-33, and is a past Vice-President, Member of the Council of the R.I.B.A. He was awarded the Royal Gold Medal for Architecture last year.

#### The New Planning Bill and White Paper

The Government's Town and Country Planning Bill and White Paper on the Control of Land Use were published on July 23rd. The most encouraging thing about them is the high level of informed criticism they have provoked. If there is little understanding of a rational approach to physical planning by the Government, at least the outlook of the five Associations representing the local authorities, the L.C.C. and the City of London Corporation, who have produced a reasoned statement of their objections, appears to be more enlightened. The only real support comes from the representatives of the property-owners and from the Tory Reform Committee.



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